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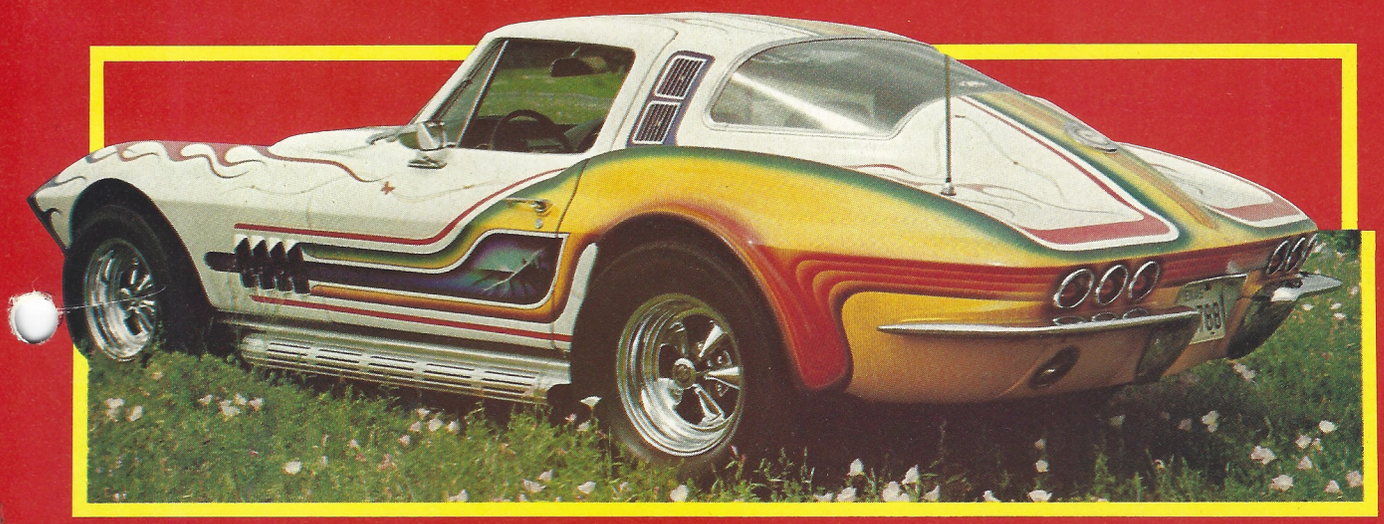

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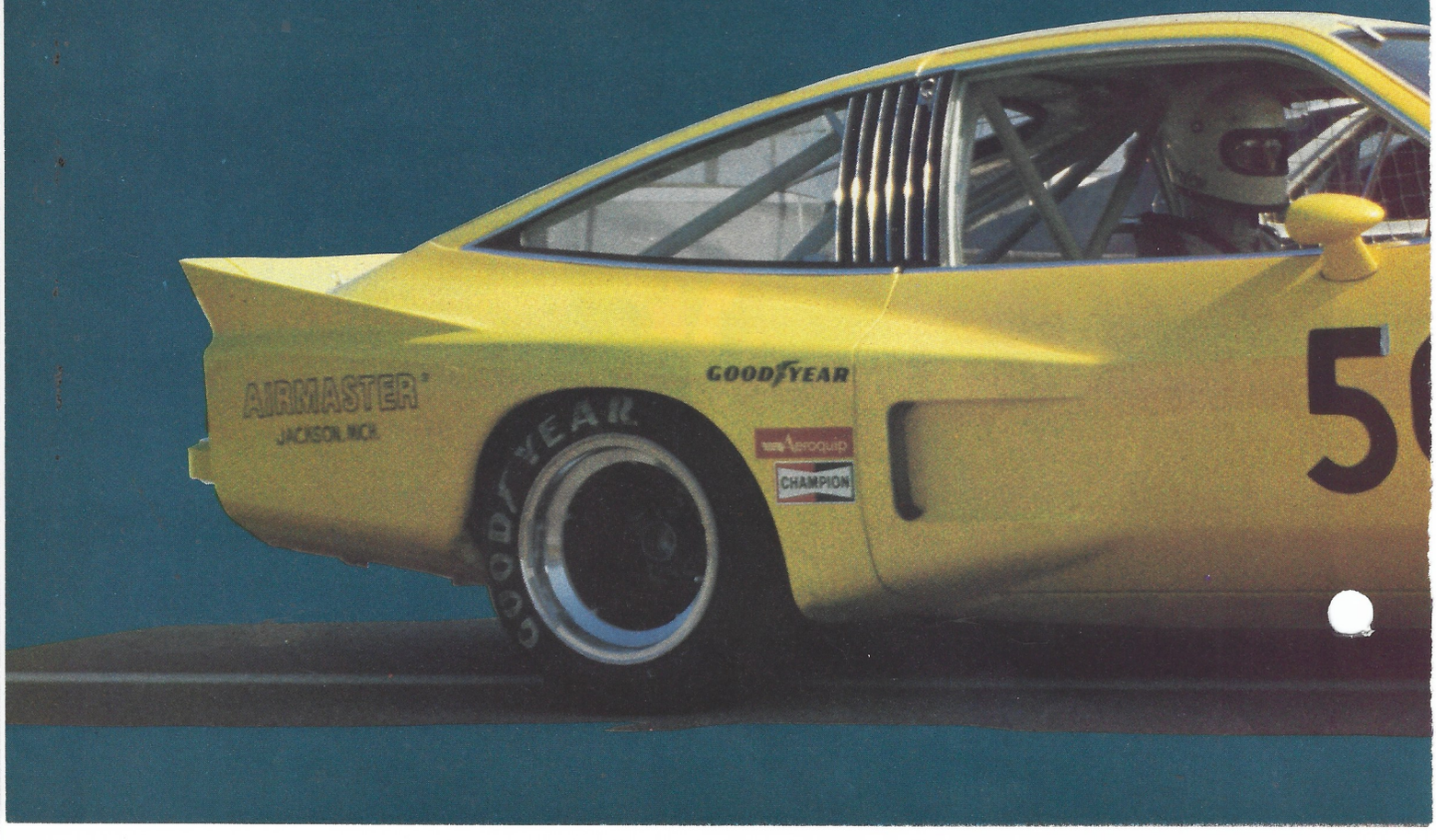
HOW TO BUILD

BY GARY WITZENBURG

The man who built cars for A.J. Foyt, John Greenwood and the late Mark Donohue reveals what went into his latest IMSA GT MONZA road racer

IT'S A WARM, SUNNY SATURDAY in late November at Daytona International Speedway and some 70 Camel GT race cars are lined up in two neat rows waiting to go out for practice. John Greenwood is ready with his latest monster Corvette, and the three-strong German factory BMW team is looking for its third straight Daytona IMSA win.

No less than seven Chevy Monzas are entered for the season finale event, but two have canceled at the last minute. Two-time Indy winner Al Unser and Australian champion Allan Moffat are driving a pair of Monzas built by



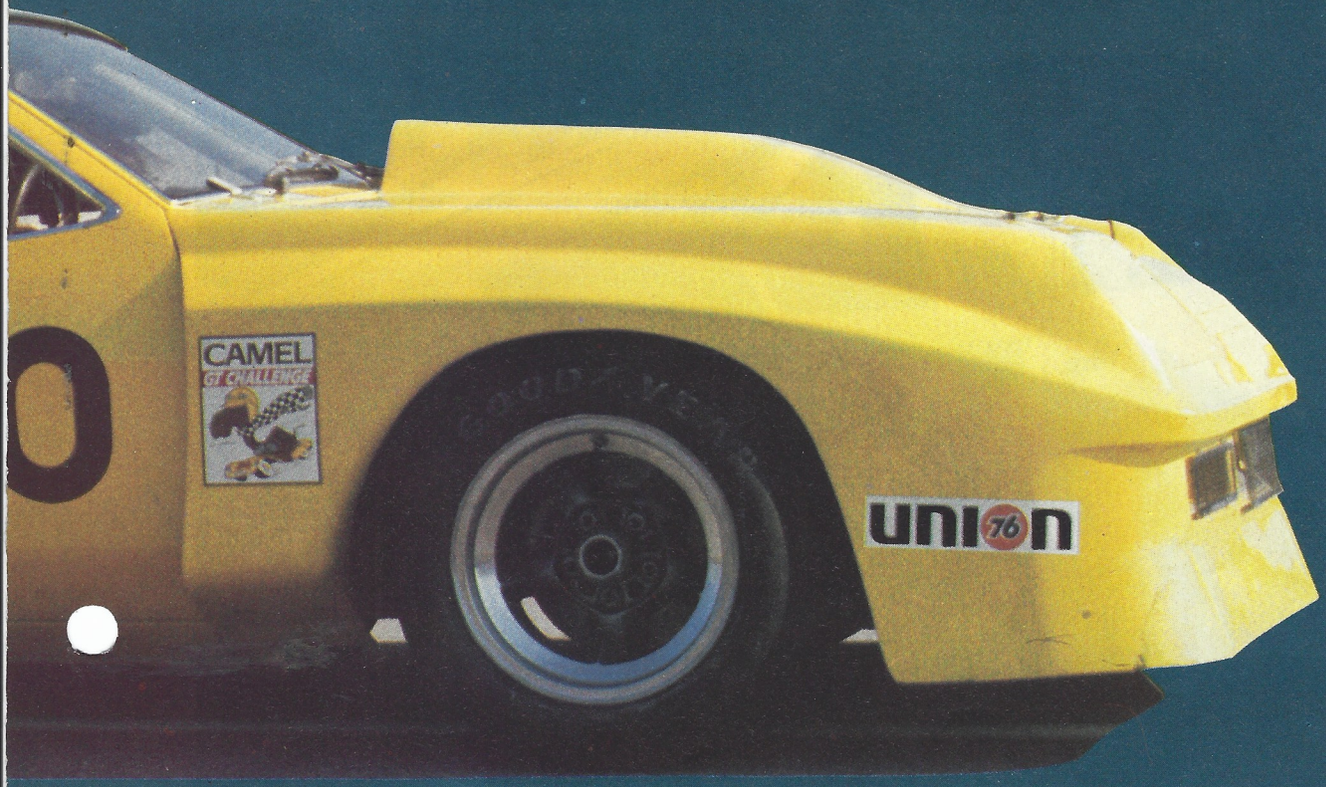
AN IMSA MONZA

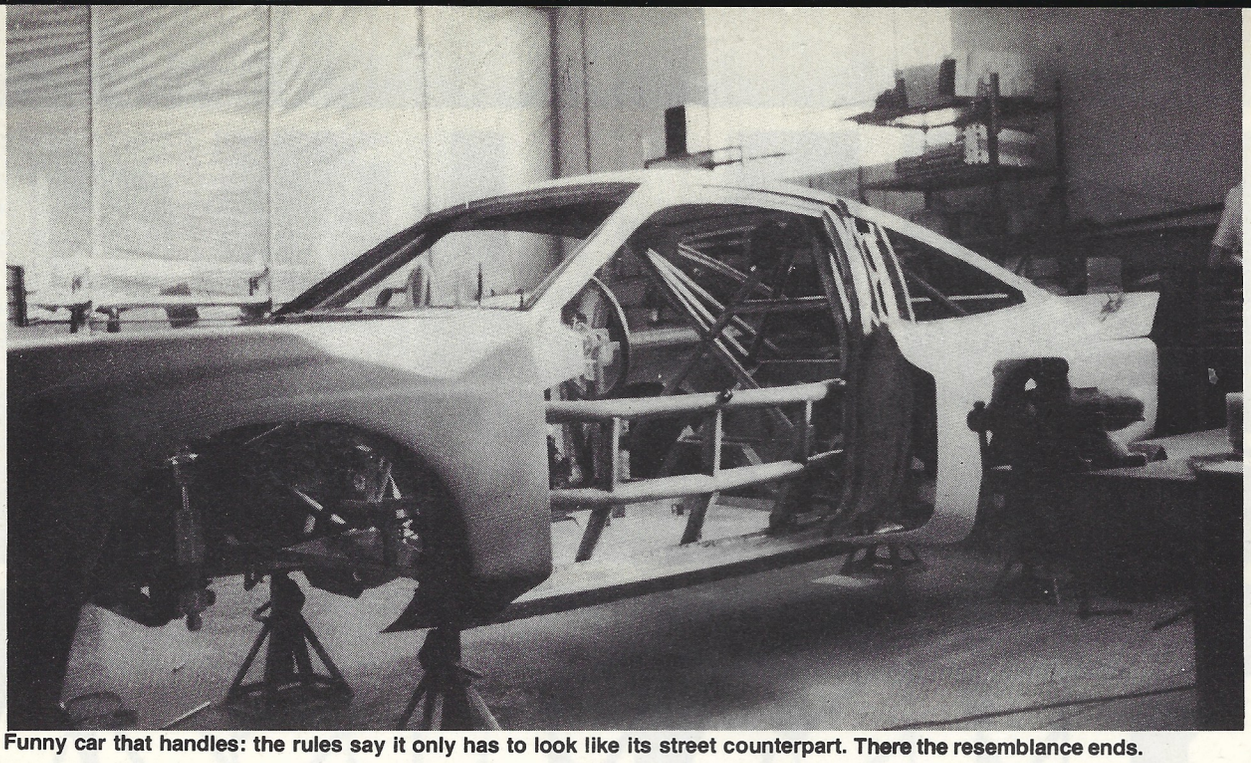
Horst Kwech's DeKon engineering, which have already proven second only to the Greenwood machines in speed. There is also an orange Red Roof Inn-sponsored DeKon Monza for Columbus, Ohio SCCA amateur champion Jim Trueman and a Grant King-built dark blue version for Jacksonville, Fla., Corvette driver Tom Nehl.

The fifth Monza on hand is a bright yellow job sitting right behind Unser's car. The yellow number 50 car is the spanking fresh creation of Ron Fournier's Royal Oak, Mich., Race Craft shop, built for Bob Lazebnik of Jackson, Mich., and driven by John Morton.

There is an impressive list of credentials behind this car: builder Fournier has worked for Holman and Moody, Kar Kraft, Roger Penske and A.J. Foyt, none of whom are known for fielding losing race cars. During that time, Fournier personally constructed the TransAm series-winning Camaro and Javelin sedans for the late Mark Donohue, prepared and developed unlimited Can-Am machinery, Indy cars and long distance road racing cars for Penske Racing and built a pair of Indy racers for Foyt that finished third and sixth in 1971.

Bob Lazebnik is best known for building and driving his





Funny car that handles: the rules say it only has to look like its street counterpart. There the resemblance ends.

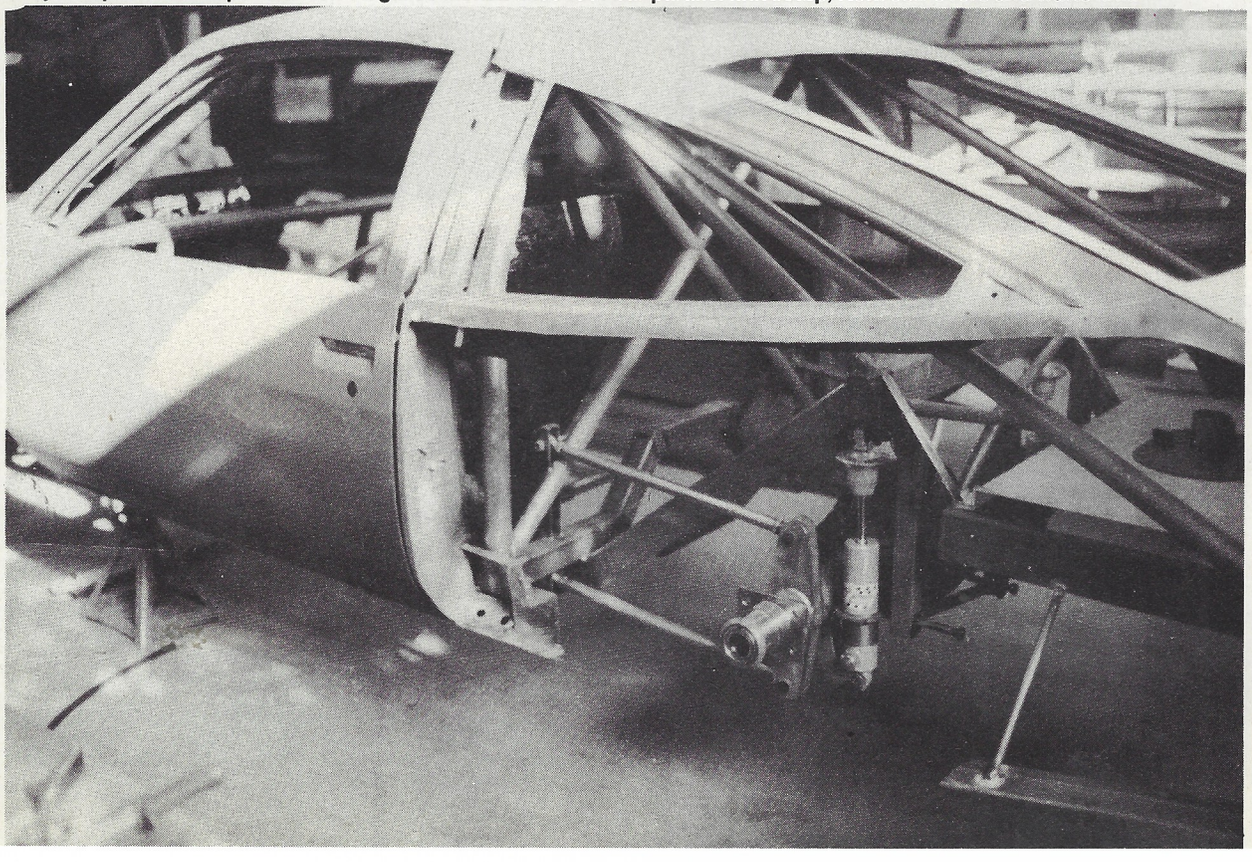
own 2-litre BMW sedans, with which he was very competitive in the small-bore TransAm series in 1971 and '72. And one of the few drivers who was faster than Bob in those events was John Morton, who piloted a factory-backed BRE Datsun 510 to series championships both of those years and has several SCCA amateur championships to his credit. Morton is also well-respected for his race car test and development skills (which is why Lazebnik asked him to drive his Monza its first time out) and he is now a regular on the SCCA's Formula 5000 road racing circuit.

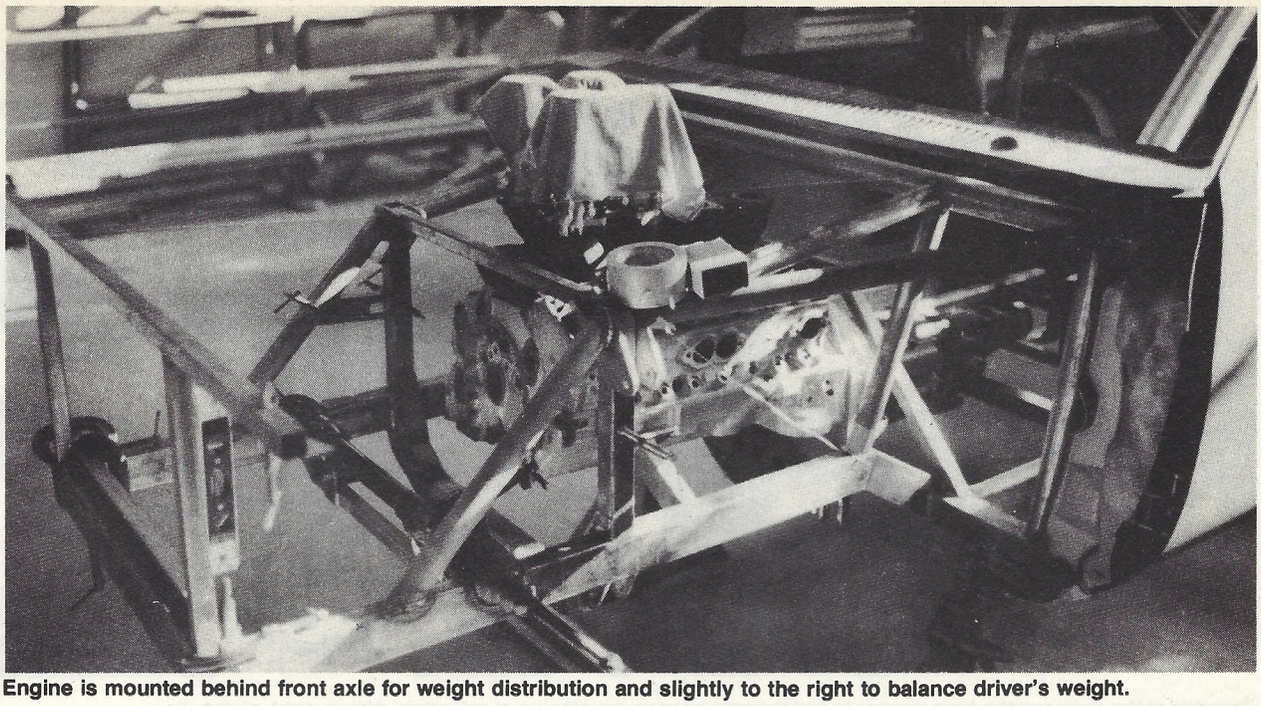
Suddenly the track is open for practice and the cars file out of the pit lane. All day long they thunder around the 3.5-mile Daytona road course, in and out of the pits, mechanics tinkering, drivers drawing maneuvers in the air with their hands and complaining about this or that problem. Morton has tested Lazebnik's Monza once before, but there is still much work to do to get the car handling properly. One problem that pops up immediately is the lack of a properly functioning limited-slip rear end, the unit that's supposed to "lock" one rear axle shaft to the other under power and prevent the inside, unloaded tire from spinning. Also, Lazebnik's Weber-carbureted 350 engine is no match for Greenwood's super-exotic big-block or the fuel-injected 350's of the Unser and Moffat cars.

In spite of these problems, Morton soon has the car turning laps in the 1:57s, an average of 118 mph and nearly equal to the fastest qualifying time for the previous Daytona event in July. Three-fourths of the famous superspeedway oval is used as part of the road course, and a lap average of 118 mph means a top speed on the oval approaching 200 mph. Needless to say, this is tough on a high-rpm engine.

Late in the afternoon, after the B.F. Goodrich-sponsored

Fully independent suspension isn't legal so Monza uses four bar parallel link setup, Koni coil-overs and watts link.





Engine is mounted behind front axle for weight distribution and slightly to the right to balance driver's weight.

small sedans and the Robert Bosch Gold Cup Super Vee formula cars have had their turns at practice and qualifying, the course is again open for Camel GT machinery. This is the all-important qualifying session, the results of which will determine the starting order for the 250-mile race on Sunday. Lazebnik's hard-working crew has made temporary repairs to the troublesome rear axle and adjustments to the chassis to make the car corner better in the infield turns. The yellow Monza is as ready as it can be to race for its qualifying spot.

The cars file out of the pits and onto the oval, then down through the first turn of the infield, gathering speed as they warm their engines, tires and brakes. Through the six-turn infield course they go, then back onto the oval, spreading out as the faster cars pull away from the slower. Morton works out the new Monza carefully on the warm-up lap and streaks past the start/finish at 180 mph, clocking a 2:01 for the circuit. Now it's time to really go to work.

But before he can complete another lap, disaster strikes. A puff of blue smoke on the back straight indicates that the engine has blown. There is no spare engine for the car, so it's all over for Lazebnik, Morton and the crew. There is nothing left to do but pack up and start the long trek back to Michigan. Ironically, even the 2:01 clocked on the warm-up lap (a 113 mph average) is good enough to place the car 17th on the 70-car grid.

Of course, the marvelous Greenwood "Spirit of '76" Corvette qualifies on the pole and goes on to win the race in a repeat of his performance here a year ago. Unser's red, white and blue Monza started next to Greenwood on the front row, followed by Moffat's all-white Monza and the BMWs of German star Hans Stuck, American Sam Posey and the reigning U.S. Formula 5000 champion, Englishman Brian Redman. Unfortunately, Unser's car broke an oil line and Moffat retired with a blown head gasket early in the race, leaving Redman and Posey to finish second and third, followed by the Porsche Carrera of three-time Camel GT champ Peter Gregg.

Back in the shop, master car-builder Ron Fournier talks about the construction of the yellow No. 50 Monza that looked so promising on its first trip to the track. "Not too many people ask you to build a complete race car, right down to the final details including wiring and paint," he says, "but Lazebnik was looking for this kind of job and we were able to pool our talents and get it done in time for the November race." The car was designed and built from the ground up in just four months, and it's a beauty.

The design work was done by Mitch Marchi, a Ford Motor Co. engineer who had a lot of experience with Ford's TransAm cars back in the days before the factories became too paranoid to race. "We were held up a little on the drawings," says Fournier, "because Mitch could only work on them in the evenings. This problem did slow us down just a bit, but everything turned out OK."

The first step is to lay out and assemble the complicated tubular chassis that is the backbone of the car. This framework provides protection for the driver, mounting points for driveline, body and suspension pieces and the crucial torsional stiffness necessary for the suspension and tires to guide the car properly through a turn. The chassis tubing is lightweight, high-strength chromemoly steel.

The next job is to mount the body and make it integral with the chassis. "We started with a 'body in white' and stripped away what we didn't need," says Fournier. "All the excess weight had to go, like the stock floor pan, the inner door panels, inner quarter panels and things of that nature that have no value in a race car. All of that is completely thrown away.

"Then we took the body as a big empty shell, lowered it over the chassis and tied it all in so that the body and chassis became one." The remaining steel body sections at that point are the roof, A-pillars , B-pillars, front firewall and rocker panel sections. "These body panels are not necessarily stressed in the finished race car," Fournier explains, "but they do add value, they add to the torsional rigidity of the chassis. Where the roll bars parallel important structural members such as the rocker panels, windshield pillars, door pillars, etc., we tied them in so that we had a network rather than just a skeletal-type chassis inside a body. This added quite a bit of strength to the car and allowed us to use less roll cage structure."

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the heads can pass. So far Engle and General Kinetics cams have been used.

So that's how Jody Pemberton has made a small 350 Olds engine produce 470 horses for long-distance track racing. Whether this is enough to compete with the big Hemis and big-block Chevs and Boss Fords remains to be seen. Maybe the 600 lbs. lower weight of the Olds will make the difference. Anyway it's been a great exercise in waking up one of the oddball engines. The only difference between one of these and a familiar Chev or Mopar or Ford is a little development effort!

IMSA MONZA

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The rear suspension uses a four-bar parallel link arrangement, Koni coil-over shocks and a watts link. It's designed to give the car the most desireable roll-centers and geometry possible with a non-independent setup. "Since the street Monza comes with a banjo-type rear axle housing," Fournier told us, "we had to retain that basic configuration in the race car, although we do use a Franklin full-floating rear end. If we could have gone to an independent rear suspension, then we would really have had something wild. But a good live axle can work too.

"For the front suspension, Mitch took a clean sheet of paper and designed the most desireable geometry he could come up with. A Mustang II rack and pinion is used, along with Corvette spindles, but those are the only standard pieces in it. Everything else is completely hand fabricated including the upper and lower A-arms. We also fabricated our own steering arms for perfect bump steer characteristics, and Fabroid heim joints are used throughout the system." As in the rear, spring/shock units are Koni coil-overs similar to the ones used in formula cars.

Brakes are Corvette four-piston calipers with ventilated discs, mainly for economic reasons. Lazebnik would have liked to go to Airhearts, Lockheeds or Girlings but felt he couldn't afford them initially. "We put in ducting to cool the front brakes using flexible hoses from holes in the spoiler, and we used a Corvette aluminum radiator to keep the weight down in front," Fournier continues. "The radiator is completely sealed and any air that comes in must go through it—the air can't escape anywhere else. Because of this, our car ran a comfortable 190 degrees coolant temperature at Daytona. A lot of people make the mistake of using the Corvette radiator without properly ducting it, and it loses its efficiency. The air's got to go through it before it works."

The fancy fiberglass bodywork is the standard narrow-body Chevrolet design. Fournier decided to stick with the narrow body for aerodynamic reasons even though there is probably some cornering power to be gained by widening it and spacing the wheels out farther. Any width up to 81 in. is OK according to IMSA GT rules. "But that would have added a lot of extra drag at high speed," he explains. "It would have been a different story if we'd had a gigantic Greenwood-type monster motor. But with the 350, we decided to keep the car as narrow as possible to minimize the hole it has to punch through the air. And our decision definitely paid off at Daytona, judging by the lap times we turned in practice.

"You go out and buy a unibody Camaro or a Vega and try to build a race car out of it. Without going into major surgery, you're going to end up with your tires sticking out in the airstream. Yet our wheel and tire widths have not suffered at all. The reason is because we've got some efficient design work being done. That's why I always prefer to build a totally-designed race car from scratch, because there's no compromise. You can do it right the first time." Lazebnik is currently using 15 x 12 Sterling Mag wheels in front and 17-in. wide Sterlings in the rear.

The front fiberglass is bolted to a separate little structural frame, which itself is attached firmly to the main chassis/roll cage structure. In the rear, special epoxy made by Goodyear is used to bond the fiberglass to the steel structure. One unique feature of the Fournier Marchi design is that the entire front body structure (hood, fenders and complete front panel) can be removed in one piece by releasing just four "quick pins" and four Dzus fasteners. "Nothing is attached to it," says Fournier, "no plumbing, ducting or anything. This is obviously for quick maintenance work."

The engine used at Daytona was a Foltz 350 Chevrolet with Weber carburetors and a Vertex magneto, putting out something in the neighborhood of 550 hp. A small block engine was chosen because IMSA rules allow a lower minimum weight than with a bigger motor, and total vehicle weight is of major importance for cornering, braking and accelerating on a road racing track. Another unique Fournier Monza feature is the lightweight, heat-insulating floor and firewall design which he first built into the Greenwood cars a couple of years ago. It's like a thin Oreo cookie with two layers of aluminum separated by an inch of polyurethane foam. "The difference it makes in cockpit heat is like night and day," he tells us. "It's the difference between being able to drive the car and not being able to drive it with the engine set back so close to the driver."

Like in the Greenwood Corvettes, the Monza's engine is mounted far back in the chassis and slightly to the right of

center for nearly even front-to-rear and side-to-side weight distribution. A Weaver dry sump is used with the sump tank mounted under the dash but completely isolated from the driver.

Gauges are all Stewart Warner, mounted in a hand-built aluminum dash panel. Interior aluminum work is all .050-in. according to Fournier, which makes for some very lightweight paneling indeed. Most of the special racing pieces, such as the 32.6 gal. Donn Allen plastic safety fuel cell and dry-break safety refueling system, and the Racemark seat, steering wheel, safety shutoff switch and window net, were purchased from Different Drummer Racing, P.O. Box 511, Warren, Mich. 48090.

The lovely car's only sponsor so far is Lazebnik's own Airmaster Fan Co. in Jackson, Mich., and Bob is actively looking for some major support—and he'll have to find it. Campaigning a full-race GT machine in IMSA's Camel cigarette-sponsored pro series can get *very* expensive. Just the cost of Fournier's labor and materials, plus the designer's fee, was $10,000. The completed car ran something like $26,000 with engine, driveline, wheels and all the other equipment, and the total investment to get it to the first race last November was already up to about $30,000, according to Lazebnik. "This IMSA GT racing is a very, very sophisticated type of competition," says Fournier. "The car is completely hand-built. They call it a 'silouhette' series now, meaning that the race cars only have to look like their street counterparts."

This is the first IMSA car Fournier has done with a tubular chassis from the ground up, since the Greenwood cars have to start with the basic Corvette frame, and he seems to have done a first-class job thanks to the pooled talents he has on hand. Lazebnik was very pleased with the car the first time out. "Yet we will learn more with each of these cars we do," he says. "And there is still a lot of room for engineering innovation in this class of car." For instance, Race Craft is now busy building a Mustang II Camel GT car that is scheduled for completion in time for the Daytona 24-Hour race at the end of January. This car, which is to be driven by former Corvette racer and Can-Am Porsche pilot Charlie "Supershoe" Kemp and sponsored by ArmorAll Products, is being done essentially like the Lazebnik Monza except that the body is being constructed from loose pieces. "In other words," Fournier explains, "instead of ordering a whole body we ordered a roof, two rear quarter panels, two doors, two A-pillars, two B-pillars, etc. Then we'll piece it all together and get a great weight savings, because we end up without a lot of the inner panels and parts that are not needed anyway."

The lesson here is that the level of

sophistication in most forms of racing has gotten so high that it no longer pays to "do it yourself"—at least not unless you can assemble some very special talents in your own shop. If you want to be competitive in IMSA, NASCAR, IHRA, NHRA, SCCA, SCORE or whatever, you had better go to a professional like Fournier to get the job done. Invariably, you'll end up with a better product at an equal or even smaller investment.

And if you want to see the results of Fournier's work in action, just catch one or more of the exciting IMSA events. The season starts at Daytona in January, moves to the famous Sebring, Fla., 12-Hour contest in late March, then migrates to most areas of the country with some 16 races from coast to coast. Don't miss the Greenwood Corvette and the rest of the fiberglass flyers, plus the All American GT Monzas and Mustangs and Camaros vs. the powerful and agile German BMWs and Porsche Carreras, the Japanese Datsun Z-cars and the whole bloomin' show. It's going to be the best year ever for Camel GT racing. And if he can land the sponsorship he needs, Bob Lazebnik's yellow Monza should be right in the thick of the battle.

CLUTCHES

(continued from page 36)

Street discs have a spring hub with either five or eight springs, designed to give a little cushioning action and to prevent parts breakage. They also have Marcel which means that the clutch facings are separated by wave springs built into the disc. When the clutch is being engaged the wave springs are flattened, but in the process they give a gradual engagement.

On race clutches, you can use either a spring hub or a solid hub. Both work, and both have pros and cons. The spring hub adds cushioning and keeps parts from breaking, the solid disc is lighter and gives faster shifts. The solid disc on the street gives a very harsh engagement and leads to chatter. In a street-strip combination bonded facings and a spring hub are your best bet. For all-out racing in a car that is towed to the strip, a solid hub and pucks are Weber's latest answer.

When you install a new clutch disc, first check it on the transmission spline; it should ride freely and it should also not be loose on the spline. If you install a new disc on a worn-out clutch shaft, the splines in the disc will get hammered out. Now the disc wobbles when the clutch is disengaged, drags and causes missed shifts. If the disc can't slide freely on the spline, the clutch will also drag on disengagement.

Clutch facings are meant to work dry, and greasy fingerprints won't help them. While some lubrication is needed at the clutch hub splines and the pilot bearing, don't add so much that grease slings out on the facings. A light coat is all it takes. Also, use only high temperature grease.

The latest of the Weber pressure cover assemblies is the Combination which gives you the best of the Long and Borg and Beck features. There are 12 springs as on the Borg and Beck, forged released fingers as on the Long, and a very positive way of piloting the release levers. Unlike the roller assist on the Borg and Beck, which sometimes jams, the Combination has a centrifugal bob weight built into the lever, just like a Long, and never sticks.

Weber designed a special cover for this clutch with thicker walls and more support for the springs. At the same time, they also went to high grade silicone springs which resist heat and don't sling out and get bent. You seldom need super pressure. There are people who use extra stiff clutches and all they get from it is a stiff knee and a burned-out thrust bearing in the engine. High spring pressures will give you more problems with clutch linkage, release and shifts.

If you use a moderate rpm, 7500 or less, some centrifugal assist will help, and at the same time it will allow spring pressures in the 2800 pound range. In a high rpm engine such as an all-out small block Chevy, you can't use centrifugal assist because it makes the car creep in the lights. For Chevy owners, a Long clutch and all its benefits are unavailable unless they switch to a deep bell housing. On the other hand, a Combination clutch is a straight bolt-on into a Chevy and works just like a Borg and Beck or a Long, only better.

The diaphragm clutch is perfect for a street application and has very light release pressures, thanks to its inherent design. For racing purposes, the diaphragm offers a very sudden engagement action. This can be great if you want to shock the tires but it also calls for stronger driveline parts. Somewhere along the line you'll have to strike a compromise between sudden clutch action for instant shocking of the tires and a cushioned street action. For the first you would go to a Diaphragm or Combination clutch and a solid hub disc with sintered pucks. A bit smoother would be a solid disc with no Marcel or wave between the facings and a spring hub, together with a Combination or a Long clutch. For street and strip, a spring hub and Marcel will give you much better and chatter-free action, for low rpm takeoffs.

The play at the pedal is not a good indication of a clutch adjustment. Any looseness in the linkage can give you the feeling of play when there actually isn't any at the throwout bearing. Your best bet is to disconnect the spring at the throwout fork and check for play at the fork so that you can feel the release