

# Apples and razors

“We’re polishing the apple, putting a finer edge on the razor,” Paul Hasselgren tells Anne Proffit as she investigates how his eponymous racing engine company interacts with its supply chain

The Grand-Am Rolex Sports Car Series is a battle between manufacturers on both the engine and chassis side. In the Daytona Prototype class, engine makers Pontiac, Ford, Toyota’s Lexus brand, Porsche and BMW compete on the same circuits with wildly diverse powerplants. Paul Hasselgren’s Hasselgren Engineering, otherwise known as Hasselgren Racing Engines (HRE), working from the counter-culture haven of Berkeley, California, is constructing Pontiac engines for two teams in 2007: SAMAX Motorsports and Rock Valley Oil (RVO) Motorsports.

HRE’s 10,000 square-foot facility lies adjacent to Berkeley’s Bayshore Freeway and offers San Francisco Bay breezes. Paul Hasselgren has been in this shop since 1987; he started the business ten years earlier. He chose to compete in Grand-Am, “Because there’s only a few road race series where we can build engines that are not spec,” he told me.

“There’s quite a bit of control on the motors; it’s a controlled camshaft, controlled valve size and controlled port, but you can do a lot of things within the parameters that they give you. It’s working toward a better power curve at that point,” Hasselgren said.

Hasselgren chose Pontiac because “it’s the only motor I can build,” he laughed. “Toyota, Porsche, BMW and Ford don’t encourage private engine

builders in this series, by parts availability or pricing. Pontiac has been a very helpful partner in parts and engineering support.

“They seem to have a good following with the competitors and GM is very involved in the series.”

The LS6 blocks arrive from GM at the Berkeley shop ready for machining by Hasselgren’s crack crew. Gregory Prior, the manager of the Grand-Am Pontiac program at General Motors has acknowledged HRE’s assistance in the development of the block for Daytona Prototype racing purposes. “We regard them very highly,” said Nick Lester, GM’s Daytona Prototype track support manager and development release engineer.

“There’s a lot you can do,” remarks Hasselgren. “There is a lot of prep on the block and the cam bores have to be trued up.

“The cam profile is controlled by Grand-Am as far as maximum lift and duration. You can move that profile around a little bit and try to take advantage of what it will give you.

“Reliability is the important thing, especially with the camshaft, because it’s hard on the valve gear. So you can’t get radical with it. You push the limits and try this and try that. And generally you come back with something reliable.”

HRE has 10 Pontiac Grand Am engines in rotation and it uses two dynamometers, an older DTS and a newer Austrian AVL water-brake. “It is a lot more complicated,” Hasselgren said of the AVL unit, “and will allow us to do some track simulation. It’s not as good as a transient dyno, though, where you can do a more accurate simulation of track loads.”

As the shop’s primary dyno operator, Paul Hasselgren keeps each engine on the machine for about six hours. “I do a bed-in, and a valve lash. We always do a power run and try a little thing or two,” he suggested. “So an engine might be sitting on there two hours while we try something.”

HRE finished a close second, on the winning lap at this year’s Daytona 24 Hour race. The company hasn’t simulated a 24-hour race on the dyno due to the



Paul Hasselgren



The Pontiac Grand Am V8

expense involved.

“It comes down to the cost. The teams are running on pretty tight budgets. You can’t get so crazy with the motors that the reliability drops off. Of course the worst thing you can do is not finish. It’s just like any other series in that respect.”

Balancing power and reliability, together with factoring in fuel mileage is the primary challenge here.

“There are things that you try and you find out whether or not there’s a risk,” Hasselgren said. “If they seem like a reasonable risk and you have some time to play with it on track and see how it’s going to work, you can try it. It’s always small increments of change.”

**“In Daytona Prototype you can’t get so crazy with the motors that the reliability drops off”**



Paul Hasselgren at the dyno

The Hasselgren DP Pontiac engine runs about \$53,000 delivered, average for that breed. It was the SAMAX squad that finished second at Daytona and it followed up with 11th in Mexico City and fourth at Homestead-Miami Speedway to lie third in the early season standings. SAMAX came to Hasselgren in a rather unusual fashion. They were having some engine issues and competitor Pacific Coast Motorsports loaned the team a Hasselgren Pontiac DP engine at Homestead-Miami Speedway in 2006. SAMAX never went back to the former builder.

“Peter Baron (of SAMAX) is great to work with; he knows where he wants to go,” Hasselgren said. “If you look at where he started two or three years ago with just a Porsche GT and where he’s at now, he’s doing a good job.” Engine maker Pontiac held the top slot through the first three Daytona Prototype races of the season, aided by SAMAX’s results with its Pontiac/Riley.

Prior to joining the Grand-Am Series, HRE had been best noted for its quarter-century-plus work with small displacement four-cylinder engines used in the Champ Car Atlantic and Toyota Atlantic championships. Conversely and simultaneously, HRE has also built V8 Ford engines for the Trans-Am Series, as described in Race Engine Technology 014 (May 2006).

## ROBERT BOSCH CORP.

Raleigh, North Carolina based Manager, racing programs for Robert Bosch, Wolfgang Hustedt has been part of the American racing scene for over 30 years. He knows the difference between professionals and posers. “Paul Hasselgren knows what he’s talking about and is always focused on what he needs,” Hustedt said.

Hasselgren is currently helping to develop Bosch’s Motronic MS 4.3 engine management system, which from this year is mandatory for Daytona Prototypes.

“We have enjoyed an excellent working relationship with Bosch engineers in the US, Germany and Holland” said Renu Malhotra, Hasselgren’s systems engineer. “Feedback on sensor life, ECU algorithms, and strategies works both ways.

“We got our feet wet with the MS3.3 in our 2005 Trans-Am effort and we expanded our skills with the MS4.0 in Daytona Prototype last year and Koni Cup this year.

“We have worked closely with Bosch and race team engineers to

## THE HASSELGREN ENGINEERING FILE

### PRODUCT:

Race engine design, construction and rebuild

### RACING MARKET:

Grand-Am Rolex Sports Car Series

### HEADQUARTERS:

Berkeley, California

### WEBSITE:

www.hasselgren.com

### KEY PEOPLE:

Paul Hasselgren: Owner

Renu Malhotra: Systems engineer

William "Oz" Anderson: R&D engineer

Tracy Baublitz: Engine buildup operations

### SCALE OF OPERATION:

Workforce of 14 people; facility encompasses about 10,000 square feet

### BACKGROUND:

Founded 1977 and in current location since 1987. Champ Car Atlantic Championship engine builder of the year from 1995-2003. Exclusive engine supplier 2004-5 for the Toyota Atlantic Championship. HRE built Trans-Am engines prior to the series' recent cutback and currently services Pontiac Daytona Prototype clients in Grand-Am Rolex Sports Car Series.

develop and tune the traction control so it became an integral part of the tuning of the chassis."

"We do odds and ends now with Bosch," added Paul Hasselgren. "Part of it is with Wolfgang and part of it is with GM. That gives us a little bit of access to improve our breed. I think we've proven we can handle the software. We are the only Pontiac engine builder in Grand-Am mapping our own engines with the Bosch ECU, including all the track-based functions - last year that also included traction control," he confided.

"We get items like this to Paul first because he's one of the few guys who understands [what the system can do]," remarked Hustedt. "We have no compunctions about sending him new products for development and he is, in fact, our 'go-to guy' on the West Coast."

There are never any supply-side problems with Hasselgren Racing Engines, according to Hustedt. "We send Paul's ideas to our sample shop in Germany and our turnaround from idea or concept to reality is about four weeks, plus or minus. Paul has been very helpful in our Grand-Am spark plug development," he added.

**"I was able to support the idea for a compact engine package with a 10 mm wide drive belt"**

"I think they feel we can handle just about any project," Malhotra continued, "from developing individual throttle bodies, optimum crank triggers, maps, O2 sensor locations and the like so they send special projects our way".

## CARRILLO INDUSTRIES

Carrillo has been supplying connecting rods to Hasselgren Racing Engines since the company began competing in Grand-Am, the best part of three years, according to technical sales person Scott Greatrake. "We sell quite a few connecting rods to them and we do some development with Paul and Oz (Anderson, HRE's R&D engineer), based on certain parameters they may request," he said.

There are no supply issues with HRE, Greatrake confirmed. "We have no issues with turnarounds and we get lots of useful feedback from them. HRE is one of those clients who help us with the refining of our products, even though we do all of our communication by fax, email or phone."

Greatrake hasn't been to the HRE shop in Berkeley. It is about a six-hour drive from Carrillo's San Clemente, California home base, where they've been located for over 15 years.

## DAILEY ENGINEERING

Dailey Engineering's oil pumps and pans are hidden from view on Hasselgren's Grand-Am Pontiac engines, but the small Temecula, California firm has been part of the project for the past two-plus years. "We're always on the phone with Paul or Oz," said owner Bill Dailey. "They are such good guys to deal with. There's a high level of engineering skill at that company and that's what we like."

Hasselgren inherited some of Dailey's products on existing engines, which is how the relationship started. What Dailey's company produces for Hasselgren is a billet aluminium dry sump oil pan with an integral six-stage dry sump oil pump that has an air/oil separator.

"I was able to support Oz's idea for a compact engine package with the use of a 10mm wide drive belt for the oil pump, in line with the power consumption requirements of the oil pump as compared to the power capacity of the belt," Dailey acknowledged.

"What I liked about Oz was that he knew what he wanted and was able to give the information to me in an engineering manner. We went back and forth a few times and then the configuration was locked in," Dailey noted.

"Hasselgren Racing Engines has always been very respectful of what it takes to produce these items; our lead time depends on the time of year and, in the beginning of the year we run about two to three weeks. They have always given me a heads-up that orders will be coming through with at least three weeks lead. That makes it very easy for us to accommodate them since we can get parts in process before the order actually shows up."

Bill Dailey formed his company in 1993 after working in the Southern California area for various race teams. He created a facility in Anaheim nine years ago, "which we outgrew by 1999. That is when I decided to move the engineering and assembly to Temecula." Dailey's operation now encompasses 10,000 square feet between the two shops, with five people working at each facility.

## HASSELGREN RACING ENGINES GRAND-AM PONTIAC V8

Rolex Series Daytona Prototype  
90-degree V8, naturally aspirated  
99.19 mm (3.905") x 80.9 mm (3.185") = 5001 cc (305.2 cu in)  
98-octane Sunoco racing gasoline  
11:1 compression ratio  
Aluminium block and heads  
Dry liners  
5 main bearings, plain  
Steel crankshaft, 4 pins  
Steel con rods  
Light alloy pistons; 3 rings  
Pushrod; belt driven single camshaft  
2 valves/cylinder, 1 plug  
15-degree included valve angle  
Valve sizes, 2.000" Intake, 1.550" Exhaust  
Max valve lift 0.590", with 260 deg duration  
Bosch 4.3 Engine Management System  
Maximum rpm 7100

### MAHLE MOTORSPORTS/CLEVITE

Fletcher, North Carolina based Mahle Motorsports has been supplying Hasselgren Racing Engines with pistons, pins and circlips for over four years, according to Brad Green Staff Engineer - Applications Engineering. "Paul and Oz – as well as the rest of his staff – are a pleasure to work with. We've enjoyed a very open and honest relationship from the beginning through all of our development projects," Green said.

"Like any racers, they are demanding, but the very nature of the industry requires this in order to be competitive," Green continued. What he likes best about dealing with HRE is the "analytical and intelligent" nature of the company. "They continually seek any and all knowledge to gain a competitive advantage."

Being more than simply a supplier is what sets the relationship apart, Green reinforces. "The development process is productive, due to the shared knowledge and/or test results throughout the process to keep elevating the components to the next performance level."



# “He can steer you away from a mistake you might be headed for”

Working to enhance performance and extend durability, Mahle and HRE have gotten a “strong working base and comfort level that results in significant potential for gain,” Green said. Paul Hasselgren considers Green’s feedback “great. You have a relationship and you get a trust going. You call him up and he tries real hard to get the stuff done that you want done. And you trust him.”

Of course, HRE occasionally requires short turnaround time from Mahle on the products they use, but that is expected and anticipated by Green and his staff.

“For the vast majority of time, HRE seems to have a clear plan for their future needs and they plan accordingly. With their level of talent and willingness to utilize their suppliers’ expertise and knowledge, this group will continue to be a competitive force in any racing series for which they choose to build engines.”

### XCEL DYNE/CV PRODUCTS

CV Products is the North American distributor for Xceldyne valves, providing tech support specifically to Xceldyne clients. Both CV Products and Xceldyne are located in the heart of NASCAR country, at Thomasville, North Carolina. About 85 people are on-site at that facility, including Tom Malaska, Xceldyne tech support.

Hasselgren says that his business relationship with Malaska goes back to his Atlantic engine-building days. “There’s a lot to be said for working with people that you’ve worked with in the past. Tom has got a lot of background and he can talk to you about some things you might not have thought of; he can steer you away from a mistake you might be headed for,” Hasselgren said.

“Along with Xceldyne Technologies, we at CV Products work to produce custom valves made to Paul and Oz’s specifications,” Malaska noted. “The team submits their specs after developing their program for the season and I provide technical support on their valvetrain requirements and offer suggestions when we find something that may help them.”

Even with most parameters dictated by the sanctioning body, “We are able to work with them on maximizing performance inside their particular limitations,” Malaska revealed. “I have always enjoyed working with Paul and Oz (even before I joined CV Products) because they are such a professional, detail-oriented organization from top to bottom.

“They are extremely organized and don’t really have anything come up that is last-minute or rushed. Their requests are things we are able to provide them with, inside their timeframe. Essentially,” Malaska concluded, “it is really a great relationship for everyone.”

Oz Anderson at work



ARP's manufacturing facility

## ARP FASTENERS

Ventura, California based ARP Fasteners, which has been in business since the early 1970s, has a long history with Paul Hasselgren's company, dating back to 1993. Development work is a natural between these two firms, as they've converged on various projects over that period of time.

"The best part about working with Paul and Oz is that they appreciate the quality and service we provide and are flexible to work with on design and tooling constraints," divulged Chris Brown, director of specialty products at ARP.

With all fasteners manufactured in-house for all major racing series in four facilities totaling 115,000 square feet, ARP typically supplies head studs, main studs, flywheel bolts, rod bolts and items of that nature, Brown said. "Whenever possible, Paul and Oz give us the lead time we need, but racing is racing and sometimes things come up that need more urgent attention," he shrugged. "Overall, they are very easy to work with."

## MANTON PUSHRODS

Terry Manton is the owner of Lake Elsinore, California based Manton Pushrods, which supplies its Series V pushrods for the HRE Grand Am Pontiac. As Manton puts it: "Paul and Oz only order the best. With every order (and every customer) we always have dialog, so we can engineer every part for their application. We have a very long relationship with them, going back as long as 10 years," making the process fairly seamless.

While Manton doesn't get a large amount of feedback from many of his clients, he noted: "All of our customers talk with us so we can understand their application better and provide them with optimal solutions."

All of their interaction is done by phone and fax. Said Hasselgren: "He makes a very nice product and the turnaround time is the nice

part about it. We haven't done a whole lot of different pushrod engines. That was more of an 'Oz-tech', as far as dealing with Terry Manton. It's so easy to work with the guy because he does everything you want in a short period of time."

## TILTON ENGINEERING

Yet another California company, this one based in Buellton, Tilton Engineering supplies HRE with flywheels and clutches.

"Paul is pretty good to deal with because he never asks for anything outrageous," Mike O'Neil of Tilton's racing department said of Hasselgren Racing Engines' owner. "We've been doing business for at least 12 years," the relationship predating HRE's entry into the Grand-Am Series.

"Paul always knows what he wants yet he's quite open-minded and willing to listen to different opinions", remarked O'Neil. "There's a lot of trust between us and it's a seamless operation. He gives us space to work with and knows what will work with his engine and gearbox installations."

According to O'Neil, Hasselgren likes to go with "a lighter flywheel than some of our other customers and he doesn't necessarily want what others have. He's always looking to make his package better."

"We think it's working," Hasselgren advised. "Oz's job is to find an advantage."

Hasselgren says he has known company founder Mac Tilton since "he ran the business completely. So it's another one of those longtime deals. You build up a good relationship and they take care of us. We're always sending off maps and given his experience, that's the nice thing. Sometimes we surprise them with a good idea!"

## JESEL VALVETRAIN INNOVATION

Lakewood, New Jersey located Jesel supplies quite a few parts to Hasselgren for the Pontiac DP engine, including timing drive components, tappets and rockers. According to Jesel's Rob Remesi: "Oz worked directly with Tim Fodor in our engineering department in the development of rockers for the Grand Am engine package. Oz had ▶



Tracy Baublitz

## HASSELGREN GRAND-AM SUPPLY CHAIN

### Outside suppliers:

Heads/Block: GM  
 Crankshaft: proprietary  
 Camshafts: proprietary  
 Timing Drive components: Jesel  
 Pushrods: Manton  
 Tappets: Jesel  
 Rockers: Jesel  
 Pistons: Mahle  
 Rings: proprietary  
 Piston pins: Mahle  
 Circlips: Mahle  
 Con rods: Carrillo  
 Main bearings: Clevite  
 Seals: proprietary  
 Fasteners: ARP  
 Valves: Xceldyne/CV Products  
 Valve seats: Kibblewhite  
 Valve guides: Kibblewhite  
 Valve springs: PSI  
 Gaskets: Federal Mogul  
 Ignition system: spec GM/Bosch  
 Plugs: Bosch  
 Fuel Injectors: Bosch  
 Engine management system: Bosch  
 Throttle: GM  
 Water pumps: Wegner  
 Oil pans and pumps: Dailey  
 Alternator: Bosch  
 Exhaust: proprietary  
 Air filter: K&N  
 Pulleys: CV Products  
 Flywheel: Tilton

### In-House design and manufacture:

Crank and cam sensor bracket  
 Cam core  
 Valley cover  
 Crank trigger wheel  
 Alternator support  
 Rocker stand  
 Piston oilers  
 Chamber/ports  
 Motor mount (for the Riley chassis)  
 Air Box

specific geometry points that he wanted to utilize and with the help of Tim, they came up with a package specific to HRE.”

Remesi enjoys working with Hasselgren’s group because “Oz provides all the required information at the onset of any project. The engineering software available today greatly increases the accuracy and response time needed to complete a project in a timely manner,” he said.

“The relationship between Jesel and Hasselgren Racing Engines continues to grow stronger through our joint engineering efforts and feedback from actual racing conditions. The feedback we get, through their involvement in Daytona Prototype road racing is invaluable,” Remesi concluded.

Renu Malhotra



## WEGNER MOTORSPORTS

Markesan, Wisconsin based Wegner Motorsports is a division of Stewart Components. Dan Timm, manager of Wegner, tells me that it is a small operation consisting of about 35 employees, which has been supplying Hasselgren Racing Engines with water pumps for the past three seasons. Wegner also services various NASCAR divisions,

including Busch and Craftsman Truck entities. There is one style pump for the Pontiac LS engine and that is the product used by HRE, Timm told me.

“I deal with Oz and find him a very interesting guy. He’s very intelligent and [his focus on] the engineering part of it makes him good to work with. Oz looks at everything,” Timm said, “and he’s not afraid to modify things. Hasselgren’s group aren’t looking for the easiest way to effect performance from their engines and I appreciate doing business with people like that.”

Timm and Anderson have most of their discussions by phone over the course of a year but also meet to delve into technical issues at the PRI show each December, according to Anderson. “Dan seems very capable and grounded,” Anderson said.

## ATI PERFORMANCE PRODUCTS INC

J.C. Beattie Jr. is vice president of operations at ATI, which, he notes, is one of the few firms capable of satisfying crankshaft damper needs for major race engine builders. In business at the same Baltimore, Maryland location for nearly 40 years, ATI has 30,000 square feet encompassing 25 CNC machines used by many of its 50 employees.

ATI began working with HRE on the Pontiac DP engine program about three years ago. “There was a need for a smaller diameter damper,” Beattie told me, necessitating “one that would still function well enough to allow the engine survive and the damper not to be used up during a race.”

The primary development was “through size of the damper and hub, location of the HTD drive for the belt drive system, and getting the proper amount of damper weight and material of O-rings” to permit better durability.

One aspect of ATI’s Super Damper that makes it applicable to HRE’s needs is the fact that it is tunable and can be rebuilt in the field, according to Beattie. HRE sought out ATI due to their respect within the community.

Anderson has been working with Beattie to assist in developing a specific harmonic balancer for the Pontiac DP engine that will eliminate torsional vibrations, through the use of varying sizes, weights and durometer O-rings, Beattie advised. ■