Yamaha Motor Monthly Newsletter

The 1LR-GUE engine mounted on the Lexus LFA

Spotlight: Automobile Engines

February 15, 2013 (Issue No. 2)

Automobile Engines

It began with a sports car

After cooperating in the development and production of the Toyota 2000GT sports car, the start of its manufacture at Yamaha's factory (1967) was the first major step in the company's automobile-related business.

With a limited worldwide production of only 500, sales of the Lexus LFA supercar began in 2009. Yamaha Motor cooperated in the development of this model's V10 engine (1LR-GUE/cover photo) and then manufactured it in a special, state-of-the-art facility with the most stringent quality control standards and employing a cell manufacturing process in which a single expert technician assembles the entire engine. This month we trace the roots of Yamaha's automobile engine technology in world-class supercars and the more than five decades behind our automobile-related business.

Despair and hope in Europe

In 1959, two Yamaha Motor engineers departed for Europe with a single command from the company's founding president, Genichi Kawakami: "Tour the advanced industrial nations in search of the next product to follow our motorcycles." Europe would prove to be a rude awakening for the engineers. As they visited countless industrial equipment and automobile makers, they were overwhelmed at every turn by the technological advancement and manufacturing facilities of European companies. "At times, we even felt despair seeing how far behind the Japanese industry was," they would later say.

However, they also found seeds of hope on their journey when they saw the skilled craftsmen at work in the factories of companies like Pininfarina in Italy and Porsche in Germany. "While we can't match these large mass-production manufacturing facilities," they thought, "if it's a sports car produced in smaller lots by skilled

For the YX-30 (Type I) prototype completed in 1960, Yamaha succeeded in developing the world's first all-aluminum engine. In track tests, the car recorded a top speed of 144 km/h.

craftsmen, we could make it work." "These sports car brands excel at engineering and design technology. If we too learn and polish these skills, it'd be possible to build world-class products on a small scale."
Inspired by these possibilities, the two engineers immediately set to work on preparations to begin developing a sports car after returning to Japan.
They were starting virtually from scratch in the R&D for this sports car, but they made amazingly fast progress. By 1960, the 2-seater YX-30 (Type I) prototype mounting a 1953cc engine was completed, followed by the 4-seater YX-30 (Type II) prototype in 1961. This achievement soon led to the start of a tie-up with Toyota Motor Company (now Toyota Motor Corp.) that continues to this day. In 1964, the two companies began working on the joint development and production of Japan's first supercar, the Toyota 2000GT.

The Toyota 2000GT - from prototype to production

In the development of the Toyota 2000GT, Toyota was responsible for the car's total layout planning, design and the basic engineering, while Yamaha Motor, under the direction of Toyota, was responsible primarily for engine tuning and detailed design and engineering of the body and chassis. The engine development team took on the challenge of converting the base engine to a DOHC layout that succeeded in increasing the power output dramatically. FRP shaping expertise gained from the company's boat building experience was used in parts like the hood and trunk lid while the woodworking craftsmanship garnered from the company's background in musical instrument manufacturing was applied in the car's interior for parts like the wooden steering wheel and instrument panel. In these ways, the car took on a number of distinctly Yamaha aspects, as well as technology and craftsmanship only Yamaha could provide.

In 1966, the Toyota 2000GT ran speed trials in what would be a successful attempt to set and break international speed records, maintaining an average speed of 203.80 km/h over 10,000 miles to beat the former record held by the Ford Comet. In all, the 2000GT set three new world records and 13 new international records.

The product of this development project was unveiled at the Tokyo Motor Show of 1965 and it went into production at Yamaha Motor's new factory (current Iwata Main Factory) in 1967. By the time production was halted in 1970, the factory had turned out 337 units with 115 of them destined for export. The sight of technicians and craftsmen hand-building these cars on the factory floor at a rate of eight cars a month, was just like what the two pioneering Yamaha engineers had seen in the sports car factories of Europe back in 1959.

Building high-performance engines, for Toyota, then for Ford

With development of the Toyota 2000GT underway, Yamaha began cooperating in the development of the Toyota 7 racing car that would go on to win the 5000cc class of the Fuji Endurance Race. In these ways, Yamaha was now polishing its technology for not only production engines but race engines as well. In 1985 came the next milestone in the company's automobile engine business, the signing of a new contract to develop and supply high-performance engines to Ford Motor Co. in the U.S.A.

Yamaha designed and built for Ford a DOHC 4-cam, 24-valve, V6 engine to be mounted in nothing less than the top-of-the-line sports model in Ford's popular Taurus line, the Taurus SHO. Developed for high output and smooth response, this high-performance engine had features like a variable intake valve that helped give it a net output of 220 hp.

Automobile engines manufactured by Yamaha are characterized by their high-rpm, high output performance drawing from the company's motorcycle engine technology. Until now they have been used primarily in car models where sporty performance is expected. Prime examples are the "2T-G" (1600cc) engine used in a number of Toyota models in the 1970s with a total production of some 300,000 engines, and the "1G-G" (2000cc) engine for the 1982 Toyota Soarer luxury coupe that featured the first 4-valve cylinders ever on a mass-production automobile engine, which went on to become a new industry standard. This breakthrough also brought recognition in the form of the coveted Japan Society of Mechanical Engineers Medal.

The "Toyota 7" was developed to the specification of the "Group 7" class of international endurance racing for 2-seater cars powered by large-displacement engines. It went on to be a top contender in various race classes in Japan.

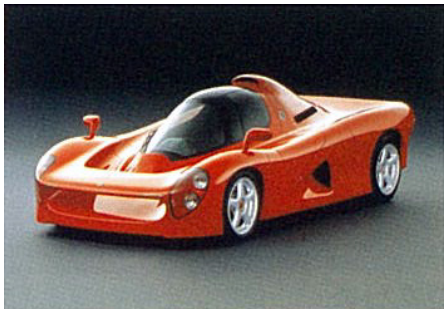
Taking on Formula 1, the world's greatest racing challenge

In 1989, as Yamaha's OEM business in automobile engines was growing, the company took on the new challenge of competing in Formula 1, the world's premier automobile racing series. In that first year, Yamaha supplied its exclusively developed "OX88" V8 engine to its racing team partner Zakspeed. Later, Yamaha developed V12 and V10 engines that were supplied to the Brabham, Jordan, Tyrrell and Arrows F1 teams. Over a span of nine years these Yamaha engines powered F1 machines in a total of 116 races.

Yamaha's F1 campaign also led to the realization of another long-held dream, building its own unique sports car.

In 1997, Damon Hill drove the Arrows Yamaha F1 machine to 2nd place in the Hungary GP, the best-ever F1 finish for a car powered by a Yamaha engine.

The development of the “0X99-11” GP supercar was announced in 1992. And indeed it was a dream car, mounting the Yamaha 0X99 F1 engine on a carbon monocoque frame and wrapped in a handcrafted aluminum body. The announcement that Yamaha would release such a GP supercar as a street-legal machine amazed and delighted automobile fans around the world.
Unfortunately, however, worsening conditions in the economy after that prevented the car from ever going into actual production. Nonetheless, its name would have a place in corporate history as the only complete car announced as a production model bearing the Yamaha name.



Yamaha’s “0X99-11” was unveiled as a GP supercar planned to go into production. It mounted a Yamaha F1 engine in a super-aerodynamic body designed by famous Japanese car designer, Takuya Yura. Unfortunately, the worsening economy caused that dream to end before production started.

The two Yamaha engineers that had set out on a study-tour of European makers for the company in 1959 had come back with hopes that it would be possible to build a world-class sports car on a small production scale, if they set out to learn and polished their design and engineering skills as they went. In the half a century that followed, Yamaha Motor built on that dream to the point of taking on the challenge of F1 competition and also building a purebred Yamaha brand GP supercar. And, we wonder if those same two engineers who had said, “At times we even felt despair seeing how far behind the Japanese industry was,” could ever have imagined that today, Yamaha Motor’s automobile-related business would develop and succeed to the point of cooperating in the development and manufacturing of the engine for a leading supercar like the Lexus LFA.

Message from the Editor

This month we introduced the history of Yamaha Motor's automobile-related business. What did you think of the story?
As it mentions, the company's automobile-related business has a history of over half a century, during which time approximately 2.89 million automobile engines have been supplied to carmakers in Japan and abroad on an OEM basis. Presently, Yamaha Motor is manufacturing engines for the Toyota Crown and Mark X models and the Lexus IS and GS models. In recent years, we have also developed the "REAS" (Relative Absorber System) suspension system that improves ride comfort and handling stability as well as the "Performance Damper," a device that can be fitted to an automobile chassis to heighten the quality and comfort of the ride. It is another highly acclaimed Yamaha-exclusive technology.
Many of you may have not associated Yamaha Motor with automobile engines before and were a bit surprised to learn about the history of our automobile-related business. The next time you take a look under the hood of your car some weekend, you might just be looking at an engine manufactured by Yamaha.

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