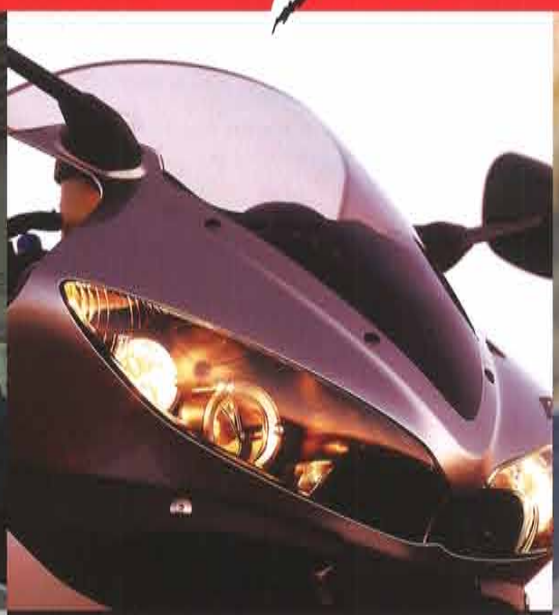
YAMAHA MOTOR CO., LTD.

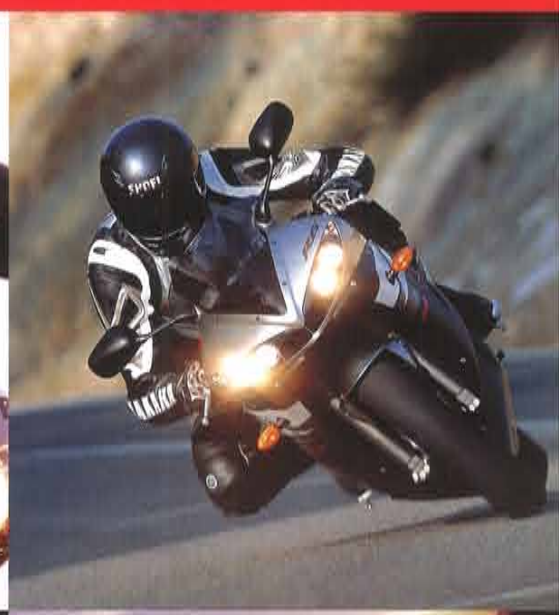
Yamaha News

NOVEMBER 1, 2002 ENGLISH

No.5

BIMONTHLY

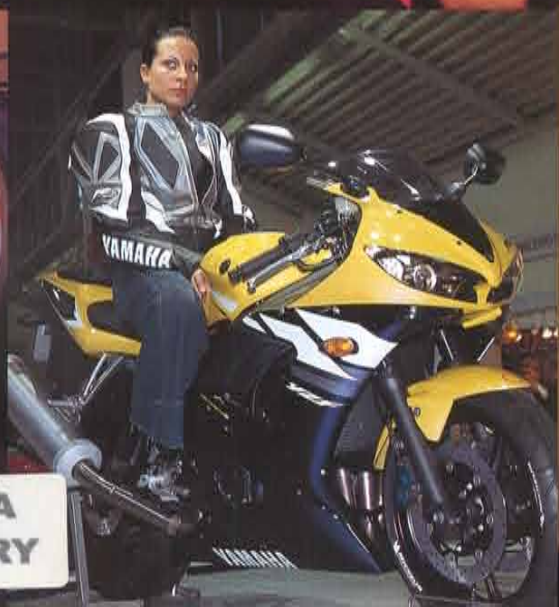




R6

High-tech Never Looked This Good

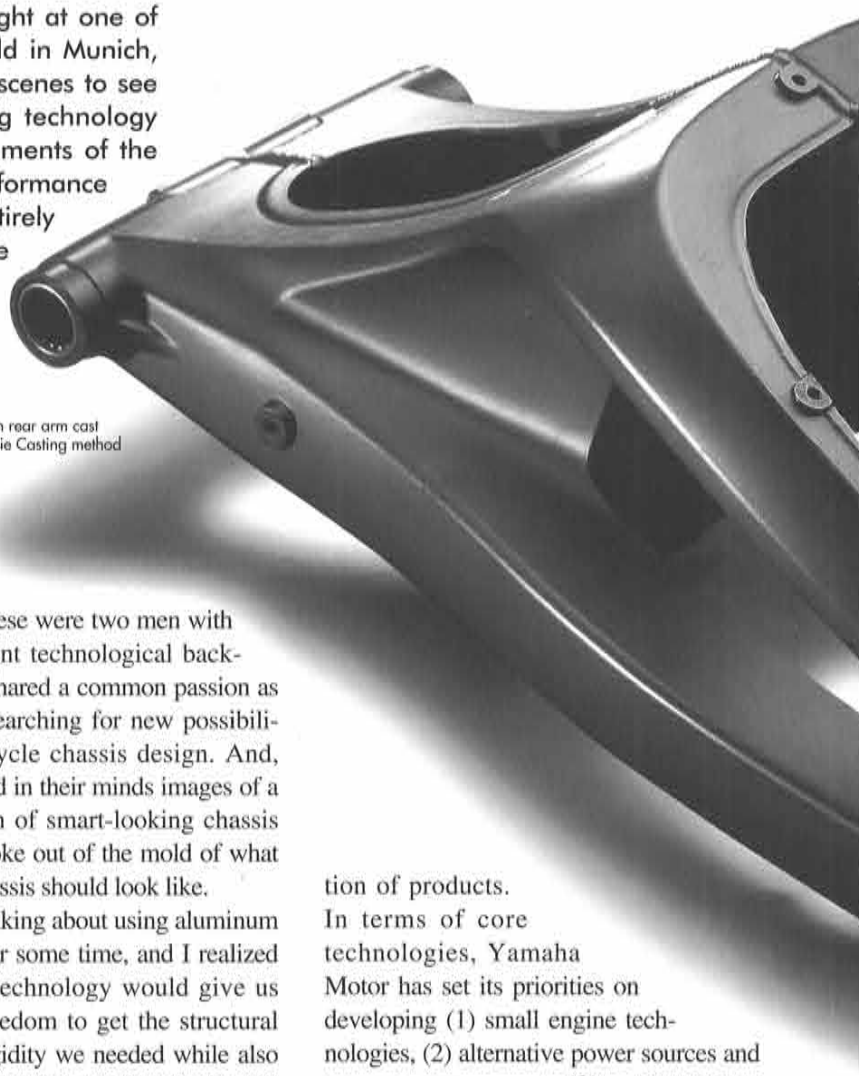
The YZF-R6 is back with a new look in an all-cast frame made possible by a revolutionary Yamaha-exclusive aluminum casting method. Its killer combination of exciting styling and high-tech engineering stole the show in its Intermot debut.



The secret behind the YZ

New Aluminum casting technology enables breakthrough styling and

In September, Yamaha's new YZF-R6 stole the limelight at one of Europe's premier motorcycle shows, the Intermot held in Munich, Germany. Here *Yamaha News* takes you behind the scenes to see how a revolutionary new Yamaha aluminum casting technology made this new frame possible. Listening to the comments of the development project members, chassis design and performance test technicians, we begin to get a picture of an entirely new concept of motorcycle design. At the heart of the story of the YZF-R6's new look is the Yamaha-exclusive "CF (Controlled Filling) Aluminum Die Cast Technology" used in the manufacturing of the rear arm of its frame.



The R6's aluminum rear arm cast with the new CF Die Casting method

A shared passion for innovation

The story began in the summer of 2000, when Mr. Toru Kitsunai of YMC's Advanced Research Center visited the office of Mr. Yasunobu Kanou, Project Chief for the new YZF-R6's chassis development project. Showing Mr. Kanou some recent research data, he explained, "I think we have the capability now to make cast aluminum parts that are strong enough to be welded. How about trying it in a new model. We should be able to create great-looking new components with cleaner curves and higher quality surfaces than ever before."

At the time, Kanou was in the process of putting together the final ideas for the 2003 model YZF-R6 chassis and Kitsunai had caught his imagination when he said, "Let's try setting a whole new standard for motorcycle chassis design. We should be able to create frame and rear arm designs that will have a great new look." Kano didn't hestitate: "OK. Let's do it. Let's use this new casting method to make a chassis that will really impress people."

CF Project, Mr. Toru Kitsunai

Chassis design project chief, Mr. Yasunobu Kanou

Even though these were two men with entirely different technological backgrounds, they shared a common passion as professionals searching for new possibilities in motorcycle chassis design. And, they already had in their minds images of a next generation of smart-looking chassis designs that broke out of the mold of what a sport-bike chassis should look like.

"I had been thinking about using aluminum in new ways for some time, and I realized that this new technology would give us new design freedom to get the structural strength and rigidity we needed while also making the production process simpler and eliminating the need for secondary processing on the parts we deigned. But for me, it was really the styling possibilities that excited me most," recalls Mr. Kanou.

Yamaha and aluminum

Mr. Toshikatsu Koike of YMC's Advanced Research Center talks about Yamaha's history of aluminum manufacturing technologies. "Yamaha uses up to 3,000 tons of aluminum a month in the manufacture of motorcycle engines and chassis as well as other products like our snowmobiles and outboard motors. That's why Yamaha considers skillful use of aluminum one of the keys to its next generation of products.

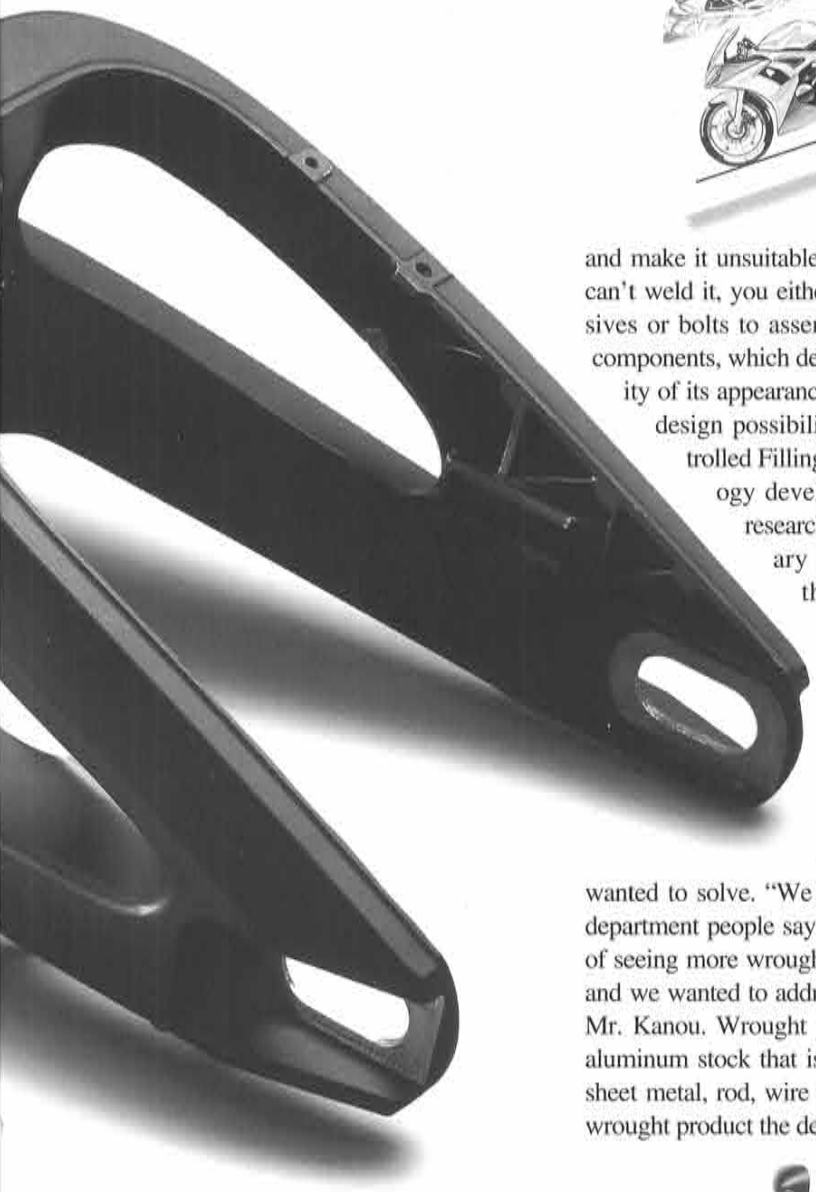
In terms of core technologies, Yamaha Motor has set its priorities on developing (1) small engine technologies, (2) alternative power sources and (3) component strategies. Manufacturing technologies for aluminum parts classify as one of the most important development areas in the component strategies category.

CF Project, Mr. Toshikatsu Koike

Casting technology is one of the areas of aluminum research that the Advanced Research Center's Applied Projects Section has devoted great energies to through its CF Project. As a production process, casting is highly efficient because it simply involves pouring molten aluminum into a mold and allowing it to solidify before

F-R6's exciting new look

performance



A design sketch from the early development stages

removing the finished part.

One casting technique that Yamaha has been using for the last 20 years is high-pressure casting. Because this method uses pressure to force the molten aluminum into the mold instead of letting it fill by the force of gravity, this method provides more accurate filling and greater production efficiency.

The drawback to high-pressure casting is that air bubbles often form in the aluminum during the casting process that limit the strength and elasticity of the resulting metal and make it unsuitable for welding. If you can't weld it, you either have to use adhesives or bolts to assemble cast parts into components, which detracts from the quality of its appearance as well as limiting design possibilities. The CF (Controlled Filling) Die Cast Technology developed by Yamaha's researchers is a revolutionary method that clears this hurdle to make weldable aluminum parts.

The choice of aluminum

There was also another problem our researchers wanted to solve. "We often heard our test department people say that they were tired of seeing more wrought product rear arms, and we wanted to address this too," recalls Mr. Kanou. Wrought product is a kind of aluminum stock that is used commonly in sheet metal, rod, wire and cast parts. With wrought product the design possibilities are pretty much limited to combinations of sheet metal and pipe, which in turn limits the possibilities from an exterior styling standpoint as well. That is the pattern Yamaha's engineers wanted to break out of in creating new chassis designs.

Mr. Kitsunai explains the concept behind the CF die casting method. "The state of vacuum in the die is increased to a level about six times greater than in conventional high-pressure casting in order to decrease air resistance when the molten aluminum is injected. Also, the temperature of the die is controlled to make sure that the aluminum flows in rapidly and completely, without premature solidification, even in the narrowest portions of the mold. The combined effect of these measures is a final cast product that has just 20% the amount of gas content found in conventional high-pressure cast parts. That means aluminum die-cast parts that have a stronger molecular structure, good tensile strength and are capable of being welded."

Technology for better products

Successful development of a new manufac-

turing technology doesn't immediately lead to its use in new products, however. Products aren't created just to use new manufacturing technologies, as Mr. Koike explains. "Our job is to develop new materials and manufacturing technologies to the point where they can be used in actual production and then to introduce them to the product development departments. It is then the job of the design engineers and developers to decide when and if the new technologies are used in new products. If you were to compare it to the world of cuisine, we are the ones who develop knives that cut well, but it is the job of the chefs to use those knives skillfully to create delicious cuisine. In this case the chefs are the product design and development engineers. The technologies never come first.


Running test project chief, Mr. Koichi Amano

The CF technology is one that enables the production of thinner and stronger die-cast parts that can also be welded. And this time it was in the chassis' rear arm that this technology was used to its fullest on the new YZF-R6."

The R6's product concept was also expressed fully in the design of the main frame. In it, the parts were made by the gravity die casting method. By controlling such details of the casting process as the temperature at the time of solidification, and by introducing variety of the latest software aspects, it was possible to design a frame that is lighter than the existing model's but also with 50% greater rigidity. Whereas the existing frame had 16 welding points, the new R6 frame has only two, which translates into a fine balance of lighter weight, better rigidity and better styling character.

"At first there was also a proposal to use CF die-cast parts in the main frame as well. But, analysis showed that it would be necessary to use closed cross-sections for the main parts, and after evaluating the strength, rigidity and shape accuracy after welding, it was decided to go with a 2-piece gravity die-cast unit. But with the rear arm and rear frame, where analysis showed that we could get the necessary strength and rigidity with an open cross-section we decided to use CF die-cast parts," says Mr. Kanou.

The technology is never allowed to dictate the product design, it must be designed to satisfy the product concept first. Kanou went on to add that, "It was having this casting method that enables exact control of the various casting conditions that made it possible for us to design this chassis. I think we can call this frame the product of multiple casting methods. It gave us a frame that looks great and is lighter, but also one that provides a really solid feel."


In particular the design sought to emphasize the increased intake performance of the new engine by creating the impression that the machine is actively pulling air into itself

Handling development and styling

In this way, the frame of the new YZF-R6 made the transition from the conventional sand-cast parts plus wrought product construction to an all cast-part frame, while the rear arm went from a wrought product construction to a CF die-cast manufacturing process. To find out how this evolution affects the actual machine performance, as it is revealed in the checks and tuning that goes on in the performance testing work, we spoke to Mr. Koichi Amano of the running test department.

"The types of materials used or the way they are manufactured doesn't change what we were looking for in developing the R6. But I got the clear impression that this new manufacturing process had raised the difficulty level of the development process. This is because, since it is difficult to make major changes once the basic shape is decided, the basic dimensions had to be decided at an earlier stage in the development process. It is also because in the early stages of the development we had to figure out how to deal with the new tuning elements involved in the basic parts.

But, no matter what kind of metal is used, the performance we are after doesn't change, so there was never any doubts about what we had to do. And, in the end we were able to get all the dimensional specs we wanted from the new components."

He then went on to emphasize that, "Through test analysis it is possible to ensure the strength and rigidity numbers that are necessary. And, in terms of straight-line running stability, it is also possible to rely pretty much on analytical data. But, when it comes to machine handling stability and feeling, there are a lot of things you can't verify unless you get a test rider on the machine and run it. With the new R6 we spent a lot of time working the fine points until we got it just as we wanted. So, I hope everyone will test ride this model and experience its handling to see that it is not just the styling that is new." Although it can't be seen from the outside, there is a patch built into the inside as a tuning element that helps achieve the new R6's fine handling balance.

The styling of the new YZF-R6 is based on a concept of "New Edge Form." And, an important contributor to the realization of this design image is Yamaha's new CF die casting technology. As Mr. Kanou says, "The chassis plays a central role in creating this machine's stylish overall look."

In short, the new R6 is an embodiment of the motto "Exciting Performance and Stylish Design" that is deeply rooted in the minds of our engineers and our corporate philosophy.

Intermot München 2002

Big Debuts at The World's Fair of Motorcycles

With the key words "Humachine technology" as its theme, the Yamaha booth displayed about 100 models in its spacious 1,320 sq.m. facing the main entrance

Press conference with World GP rider appearances

Over the five days from Sept. 18 to 22, the new international trade exhibition center in Munich, Germany, was the venue for Intermot München 2002 – 3rd International Motorcycle and Scooter Show. A total of 1,070 companies in the motorcycle and accessory industries from 38 countries exhibited at this year's show, topping the 2000 show's record. And industry representatives and motorcycle enthusiasts from around Germany, Europe and the world turned out to see what will be new for 2003.

Prior to the opening of the show, Yamaha reserved a venue at the state modern art museum Haus der Kunst for its grand press conference and welcomed some 320 members of the press. Unveiled at the conference were an exciting lineup of models for 2003 including the new YZF-R6, which has undergone its first model change in four years, the FJR1300 series with an ABS equipped model, and the brand new scooter VP300 "Versity."

At the pre-event press conference, MotoGP star Carlos Checa rode in on the big-attraction, the new YZF-R6. The renewed model was greeted with applause from the press

In his address to the press, Yamaha Motor Europe N.V.'s motorcycle division manager Robert Landman said, "At Yamaha our policy is to supply excitement to the rider of every Yamaha machine. This policy is being realized through the unique Yamaha concept we call "Humachine technology." With this unwavering pursuit of the joy of motorcycling coupled with sound environment-friendly measures, we have created a line of passionate Yamaha bikes for 2003 that are sure to bring excitement to the European market." Special guests Carlos Checa, one of this season's top MotoGP riders and World Motocross GP 500 champ Stefan Everts, fresh off his second straight title win, showed up to help introduce the new models.

The key words are "Humachine technology"

At this year's Intermot, each of the makers introduced new models in the supersport category as well as a number of new models in the sport tourer category that is so popular here in Germany. In the parts and accessory booths, the prominent presence of new Asian makers emphasized the fact that manufacturing and distribution in the motorcycle industry is becoming increasingly global.

At the press conference, the YZF-R6 development Project Leader, Mr. Hiroshi Takimoto was surrounded by journalists as he explained how his team brought exciting new performance to the 2003 model while staying true to its original product concept. "Just like with its debut four years ago, it is sure to become the new mid-class standard," he said with confidence

Amidst these trends, this year's Yamaha booth was organized around the key words "Humachine technology." Among the displays of new Yamaha models in each category, the new YZF-R6 was especially popular. Fascinated fans could be seen studying the cut-open display model of the R6 intently. Meanwhile, other enthusiasts could be heard praising the new ABS-equipped "FJR1300A" as a long-awaited addition to the lineup that is sure to become the new standard in the big tourer category.

Other new 2003 models that drew big attention included the brand new VP300 "Versity" scooter that is expected to be especially popular in Italy, the YZF-R1, BT1100 "Bulldog," TMAX and the FZS1000 "Fazer."

Report from Karlheinz Vetter, Advertising and PR Manager, Yamaha Motor Germany

Tracing the Roots of "H

A Spirit of Challenge Born on the Desert Sands

The Paris-Dakar Rally – 20 Years of Challenge exhibition held at YMC's Communication Plaza

Engineers' passion takes form in Paris-Dakar exhibition

It has been said that when your machine stops in the Paris-Dakar Rally you are suddenly in a world of void. In the daytime, when the wind stops there is not a sound and you find yourself in a void almost beyond perception, they say. The Paris-Dakar Rally that began in 1979 has often been called the world's toughest race. Temperatures careen over a range of 30 degrees in the course of a single day. Participants not only have to worry about the quality of gasoline but what dangers await out on the desert, both natural and human. The sand under wheel and in the air is a constant enemy for the roughly 20 days and 10,000 to 15,000 kilometers to be run. It is literally a survival race competed against the clock over set daily stages.

Up until now, Yamaha machines have won this grueling race nine times, BMW six times, Honda five, Cagiva and KTM twice each. From September 28 to November 23, a special exhibition titled The Paris-Dakar Rally – 20 Years of Challenge has been open to the public at the Communication Plaza of YMC's home offices in Iwata to celebrate the years of efforts that brought Yamaha the most victories of any maker.

The call for such an exhibition rose from the engineers and staff who had actually worked on machine development and testing for the Paris-Dakar, and it was made possible through the cooperation and advice of the man who, more than any other had been the driving force behind Yamaha's Paris-Dakar challenge, Yamaha Motor France's present President Jean-Claude Olivier. Today, the Yamaha engineers who worked on the Paris-Dakar machines have moved on to play vital roles in development of such models as the YZR-M1 works machine and the YZ250 motocrosser, while other staff have assumed positions in Service Operations. But, in all of them the same passion

for the desert rally and its challenge lives on. The exhibition they have helped create displays 11 former Paris-Dakar machines, including five shipped in from France. In these machines can be seen not only the glory of Yamaha's rally record but also the roots of the "Humachine technology" that is such an important part of Yamaha Motor's product philosophy today.

"Humachine technology" in machines like the unexpected 4-cylinder

The transformations of the Paris-Dakar machines through the years is a history of the development of design concepts and technologies. The XT600 Ténéré that President Olivier rode to a 2nd place finish in 1985 had a 51-liter fuel tank that was divided into three sections, the main and two side tanks, in order to achieve the ideal riding position and weight distribution. Here is one of the original examples of Humachine technology.

The fuel tank layout underwent an interesting series of changes over the years. On the YZE750T Super Ténéré machine that Stéphan Peterhansel rode to his second straight Paris-Dakar victory in 1992 the tank was also a 3-part design, but the main tank was divided into right and left units while the third unit was positioned to the rear of them. Also, the right and left tanks were made bolt-on units for easier serviceability. What's more, a cock was added that enable the rider to switch between tanks while riding in order to use the remaining fuel amounts to control the machine's front-rear weight distribution.

In the middle section of the show can be found the FZ750 and FZ920 Ténéré machines. The in-line 4-cylinder engines on these machines represented an unexpected diversion from the rally machine with norm, which was almost invariably singles and twins. It was in 1986 that Olivier chose to try mounting his rally machine the in-line four engine from the FZ750, even though a 4-cylinder would have a torque disadvantage compared to the singles and twins. "I wanted more top-end power, so I asked the Yamaha factory to develop me a prototype," recalls Mr. Olivier. It was an original idea that overturned the accepted concept of what a

umachine Technology"

rally machine should be, and the Yamaha engineers were ready to take on the challenge. It is often this kind of spirit that has given birth to Humachine technology.

XTZ850TRX brings more participants to the Paris-Dakar

A major change in the Paris-Dakar regulations came in 1995. The rally was now limited to production models, thus ending the reign of works machines from the various makers. In answer to this new challenge, President Olivier and Yamaha Motor France prepared two limited edition production models embodying their years of development experience in the Paris-Dakar. These two models, the twin cylinder XTZ850TRX and a single cylinder version, were produced in lots of 15 units each and supplied to privateer teams at a money-losing price of about 3 million yen (30,000 euro) each including a kit of extra parts, a move that contributed significantly to the growth of participants in the rally.

The XTZ850R machine that Péterhansel rode to victory in the Paris-Dakar was based on that XTZ850TRX production model, and it occupied the main stage in the exhibition at Yamaha's Communication Plaza. This machine symbolizes the desire of Mr. Olivier and Yamaha to provide outstanding machines that would help more riders be really competitive in the Paris-Dakar Rally even as its regulations changed over the years.

In this XTZ850R we can see an aspect that would affect Yamaha's policy in World GP road racing some years later. In 1991, when the decreasing number of participants in the WGP 500cc class threatened the very existence of the competition, Yamaha adopted a policy of supplying the engine of its YZR500 to privateer teams in Europe and succeeded in keeping the participation level up.

This is an example of how catering to the needs of competitors at the very top of their sport helped nurture today's Humachine technology.

The 1985 XT600 Ténéré. The fuel tank was divided into a main tank and two side tanks in order to achieve a machine layout that allowed an ideal riding position and weight balance. Air-cooled 660cc 4-stroke engine

YMF President Olivier speaks at Paris-Dakar exhibition opening

Jean-Claude Olivier, who built Yamaha Motor France into the market- leading company it is today, visited Japan for the opening of the exhibition "The Paris-Dakar Rally – 20 Years of Challenge." There he gave a talk before a group of YMC employees and technical staff. Here are some excerpts from that talk.

"The reason that I first entered the Paris-Dakar Rally was because I believed that actively involved people are an important key in introducing any new model that is going to help build the motorcycle market," said Mr. Olivier. "By actually getting on the machine myself and competing in the rally, you might say that I was making myself a missionary to sell our product, taking the word to the people in the market. As I have led YMF into successful new markets, I have also found that a good sense of balance is necessary in our business. It is not enough to simply make an appeal for the quality of our products like we did in the Paris-Dakar Rally. We also need to build a solid corporate-management structure. My experience has taught me to think in terms of balancing these two aspects of business, these two poles that I call Animation (South Pole) and Management (North Pole). This balance is necessary for sound business, and I have found that it is important to work actively to instill a full appreciation of it, in myself and our staff. I think the fact that YMF has managed to maintain an average 28% market share and a steady net profitability of about 3% in the very competitive European market is proof that this concept of "balanced business" has succeeded," said Mr. Olivier.

He went on to say that, "I feel that Yamaha's "Humachine technology" is not really a new concept to me. It seems very close to the philosophy I have been using since I started out in this business, and when I took on the challenge of the Paris-Dakar. And I believe that it is in this connection between human beings and machines that we can build the Yamaha brand image in a way that clearly differentiates us from the competitors. This is my personal Humachine philosophy," he went on to say. "And, of course, I believe in the spirit of challenge that Genichi Kawakami preached, as a key that will lead Yamaha to a bright future," he concluded. Clearly inspired by his words, the audience responded with a hearty round of applause.

Highlights of the Exhibition

"The Paris-Dakar Rally – 20 Years of Challenge"

The 1995 XTZ850R was a production model. This machine was produced at Yamaha Motor France to meet the new regulation that limited participation to machines that had sold at least 15 units on the general market. It boasted a competitive potential that was on par with the factory machines and it would enable many more participants to enter the Paris-Dakar with a potent competition bike. The machine's production name was the XTZ850TRX and it is the machine Péterhansel would ride to victory again.
(From left: Mr. Tateishi, Mr. Sasaki, Mr. Negishi, President Olivier of YMF, Chairman Hasegawa, Mr. Kato, Mr. Kamimori)

The 1992 YZE750T Super Ténéré was the last factory machine constructed by the Motor Sports Engineering Division for this rally. Péterhansel would win his second straight victory on this machine.

The 1986 FZ750 Ténéré. To narrow the gap in top speed compared to rival teams, J-C Olivier entered the 1986 Paris-Dakar with a 4-cylinder power unit, an unconventional format for a rally machine. With the handicap of the 200kg weight and other factors, this prototype failed to meet the demands of the Rally and Olivier had to settle for 12th place. But the bold attempt became a symbol of Yamaha's ongoing Paris-Dakar challenge.

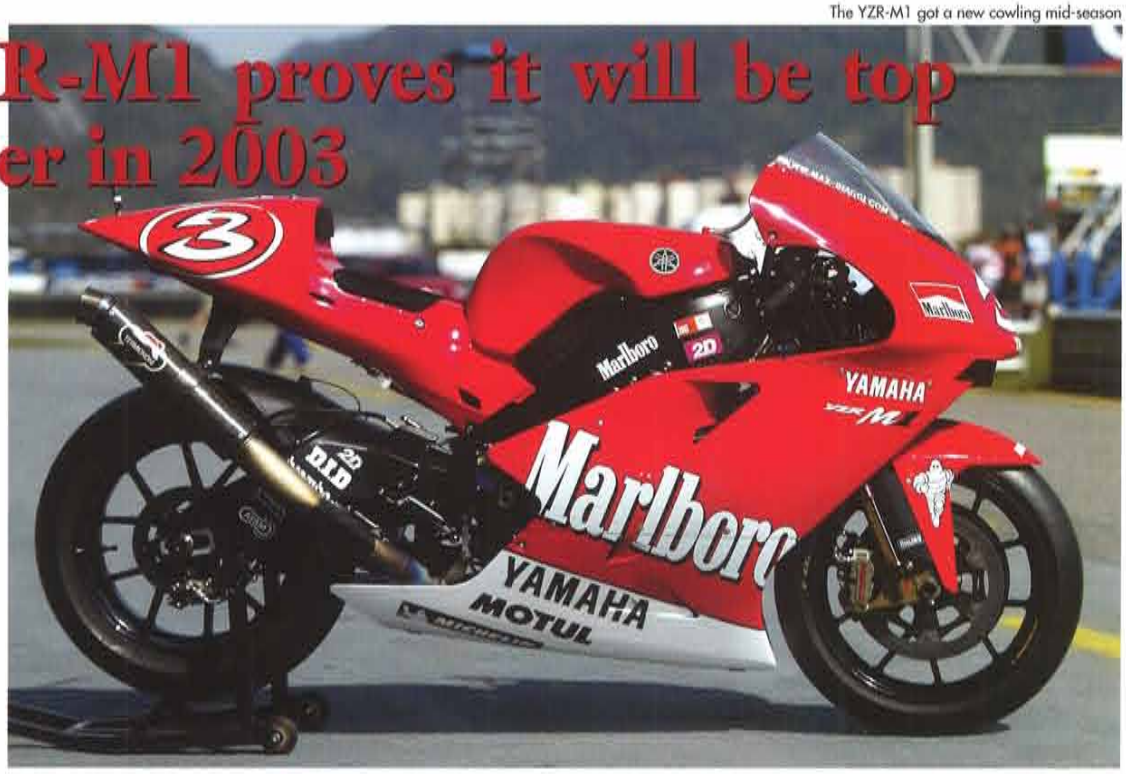
The 1989 YZE750 Ténéré is the machine that the Yamaha factory team developed in its second year working on the Paris-Dakar and it would be the last single-cylinder Yamaha machine built for this Rally. Franco Picco waged a hot battle with Gilles Lalay on his V-twin Honda and eventually finishing 2nd by just 54 minutes. Thanks to the cooperation of Honda, that NXR750 machine is also on display.

The 1988 YZE750 Ténéré was the first pure Paris-Dakar factory machine constructed by a specialized race group, YMC's Motor Sports Engineering Division. The liquid-cooled 750cc single-cylinder engine had five valves and two spark plugs. Numerous detail design touches like side stands incorporating a toolbox function that enabled the bike to be stood up on either side were adopted.

The 1991 YZE750T Super Ténéré. A total of eight of these machines were entered this year from the French and Italian Yamaha teams. Stéphane Peterhansel won the rally in his fourth try. It was a glorious 1-2-3 finish for the Yamaha machines, their first victory in ten years. The machine's engine was a liquid-cooled parallel twin with five valves and a 802cc displacement. The fuel tank had a 64-liter capacity.

The YZR-M1 proves it will be top contender in 2003

The YZR-M1 got a new cowling mid-season



In round 12 of the 2002 MotoGP series at the end of September, Valentino Rossi clinched the season title on his Honda V-5 4-stroke machine, but throughout the year, the riders who pushed him to the wire were Max Biaggi and Carlos Checa racing on the Yamaha YZR-M1. To find out in what directions the YZR-M1 evolved in its first year and what to look forward to next season, *Yamaha News* talked to the YZR-M1 development team's Project Leader, Ichiro Yoda.

Engine-brake control system

YN: What was the starting point in the development of the YZR-M1?

Yoda: To begin with, we wanted to use the chassis of the YZR500 as our working base. When we considered what type of 4-stroke engine format would best fit on this frame in light of the new MotoGP regulations, the decision we came to was an in-line four. The history of the 4-stroke engine up until the present day has seen numerous changes and evolutions, but throughout it all, we believed the in-line four to be a format that has been left behind and we wanted to try pushing this format to the very limits of its potential.

YN: What was the main point you focused on in this year's machine development?

Yoda: In actual MotoGP racing the throttle is full open about 20% of the time on each lap. In contrast, it is in the fully closed position from 35 to 40% of the time. In other words the amount of time dominated by engine braking is quite long, so we spent most of our development energy this year working on the engine-brake control system.

YN: What is the actual device involved?

Yoda: It is the slippery type clutch. We were testing two different types and using them in the actual races. With both of them we recorded data on engine rpm, speed and brake fluid pressure, etc., and we used this data to control the slippery type clutch.

YN: What other measures did you work on?

Yoda: We also introduced wheelie control and traction control measures. In all, we employ some 25 different types of sensors to monitor running conditions on the machine. We also modified the shapes of the intake/exhaust ports and the shape of the crankshaft, which has a direct effect on drivability. We changed the design of the oil passages to further reduce horsepower loss and we used the exhaust pulse to reduce pressure in the crankcase. In other words, we tried a lot of things to reduce pumping loss and other-factors.

Shinya Nakano started riding the YZR-M1 from round 14 of this season's MotoGP

YN: What kind of results did you get?

Yoda: We were able to improve handling through the turns considerably. In short, we were able to achieve better stability during engine braking, the period after you begin braking to go into a turn. Greater stability means you can go through the turns at higher speeds. Of all the courses run in the MotoGP, they say Estoril is the toughest, and I think the amazing lap time that Carlos Checa ran there this year, a full two seconds faster than last year's, is good proof of the YZR-M1's potential.

YN: How do you see the difference?

Yoda: It is very clear just watching the machines in action. You can see by its smoothness that the M1 is the most stable of all the MotoGP machines during the approach to a turn. The behavior of the machine from the time when the throttle is closed to decelerate for a turn until just before the rider begins to accelerate again is very stable.

Designing a new frame

YN: How did the frame change this year?

Yoda: Just prior to the start of the season we had a YZR500-based frame, but after the season started we tried a lot of new things to give the frame better handling stability, especially through the turns. From the Italian GP we had left the YZR500-based frame behind and began using a completely redesigned frame.

Senior Engineer, Mr. Ichiro Yoda

YN: What are the roots of the YZR500 frame?

Yoda: Its roots go back to the framework we designed when the YZR500 first adopted a dual-axis crankshaft V-4 engine with rotary disc valves in 1982. Today's YZR500 frame is an evolution of that frame and a variation of it was used on the M1 until the 4th round of this year's series.

YN: What problems did you work on in the early part of the season?

Yoda: There was a problem with the handling because of a lack of front-rear pitching during acceleration and deceleration. Also the fact that we had a single-axis crankshaft 4-stroke engine mounted on a frame originally designed for a dual-axis crankshaft 2-stroke engine caused slight problems in balancing the torque characteristics. Based on test data from actual racing we revised the position of the machine's center of gravity in a way that improved braking and handling performance.

YN: Was the new frame designed to accommodate these changes?

Yoda: The new frame included changes in the engine mounting position, the basic dimensions and the rigidity balance. In particular the longitudinal rigidity was significantly increased over the YZR500 frame. Of course we used 100% wrought parts made of duralumin aluminum alloy, which is especially good for welding. Because we use rigid engine mounts, we designed for high stress tolerance at the mounts and in the head pipe assembly. We also opened up the caster angle and lengthened the trail dimension compared to the YZR500. The fork offset remains about the same as the YZR500, however.

YN: Does all this make the frame better suited to the character of a 4-stroke?

Yoda: Rather than that, I would say it is a frame that optimizes the dynamics of the suspension and the link assembly. We also developed it with the aim of reducing stress on the tires. A 4-stroke machine has greater linearity of engine response when you open up the throttle than a 2-stroke. In terms of the leverage of the rear suspension, with a 4-stroke you can apply greater leverage—in other words, make the suspension stiffer—without increasing the stress on the tires much. Taking advantage of this, we worked on the three axes (pivot axis, drive axis and axle axis) to achieve good pitch characteristics both during deceleration and acceleration, and let this determine the basic dimensions.

The YZR-M1's meter panel

YN: What about the relationship with the tires?

Yoda: On the present machine the rear tire is much fatter than the front. When banking the machine the rear tire grips the road at a point close to its side wall which has the effect of reducing the practical radius of the rear tire and thus making the machine low in the rear. What's more, the rear wheel's grip is so strong that it ends up pushing the front tire. To address this problem we are working to achieve neutral characteristics that enable the rider to control the machine from the front. In other words, in order to achieve a good mutual balance between the machine and tires that leads to a higher level of handling performance, we are continuing to work closely with the tire technicians, sharing information and opinions.

Introduction of new features and next season's outlook

YN: In round 10, the Czech GP, you introduced a new cowling.

Yoda: Since the YZR-M1 is one of Yamaha's symbols, we introduced a new, highly modern design. Functionally, it features (1) better rider protection effect, (2) improved cooling function, (3) improved handling stability and (4) increased ram-air induction efficiency.

YN: Are you planning to introduce fuel injection in the future?

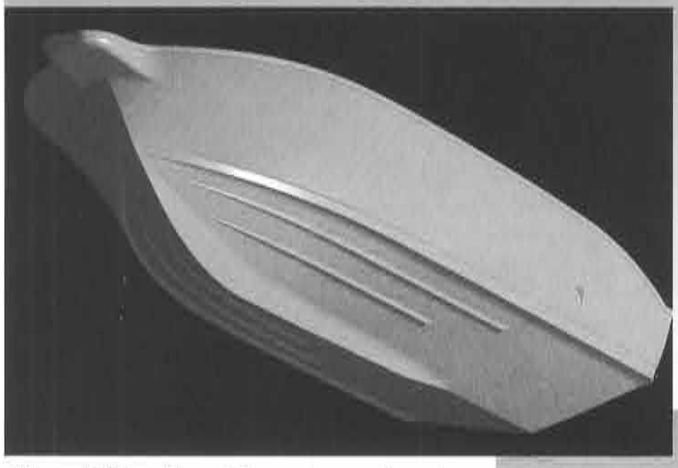
Yoda: From the '04 season there will be a regulation change limiting fuel tank capacity and, with an eye on improving fuel economy characteristics, we began running actual race tests with a fuel-injection prototype in the latter half of this season. We have big expectations for the possibility of fuel injection improving drivability, so we believe fuel injection will be one of the important elements in the M1's competitiveness next year.

YN: Can you sum up the progress made this year and the outlook for next season?

Yoda: The big achievement this year was that we created a standard for a MotoGP 4-stroke machine. We successfully tackled a lot of challenges with the new 4-stroke machine. We were developing the machine as we raced but the pace of the development was quite fast. We have come away from this season with confidence that if we apply these technologies and achievements efficiently, we can get even better results in MotoGP racing. If we can continue to improve the handling and acceleration characteristics coming out of the turns, it will give us the kind of overall competitiveness we need. I hope everyone will look forward to the YZR-M1's performance next season.

A New Yamaha Design Challenge Produces "W.T.B."

Debuts on the YF-23 fishing boat for big performance difference



A CAD image of the YF-23 hull with the W.T.B.

Yamaha's new '03 model fishing boat

The difficulty of keeping a boat pointed upwind

The new fishing boat YF-23 that Yamaha released on the Japanese market on October 10 boasts a completely new type of hull featuring an extra-large sized skeg developed by Yamaha and dubbed the "Wave Thruster Blade," or W.T.B. for short.

Boat fishing can include a wide range of techniques, from trolling to lure casting, but the most common type of fishing boaters enjoy in the coastal waters of Japan is deep-line fishing for bottom-dwelling fish while allowing the boat to drift with the wind.

In this kind of fishing it is desirable to have the bow of the boat constantly pointing upwind. This is because when a boat is left sitting with the engine in neutral it will usually drift downwind while rotating like the hands of a clock, which causes the fishing lines to constantly be twisting and occasionally getting tangled under the boat or with other fishermen's lines. For this reason, the boat's driver usually has to make constant corrections with the motor and rudder to keep the bow pointed upwind, and thus has less time to concentrate on fishing. Yamaha's new "Wave Thruster Blade" solves that problem by keeping the boat aligned with the wind all the time and eliminating the need for steering corrections.

The right balance of wind drift and running performance

The answer for designing a boat that keeps itself aligned with the wind is actually quite simple. You design a hull bottom with a bow portion that resists drifting when wind force is applied and a stern portion that drifts easily. If the bow is designed with a deeper draught and the stern is made flat-bottomed, the bow will remain stationary while the stern swings, thus keeping the bow pointed into the wind. In simple terms, Yamaha's new W.T.B. is a skeg that deepens the front part of the keel to provide resistance to lateral drift.

Of course, things are not all that simple. A boat has to run under a variety of conditions. When running into oncoming waves a deep bow is beneficial in that it helps the boat maintain course. But, the same deep bow can become a hazard when running with the waves, because when a large wave comes up from behind, the bow will tend to hold course but the stern can slide to one side or the other, bringing the boat into a parallel alignment with the wave and making it easy for the wave to roll the boat and capsize it. This phenomenon, known as broaching, is one that seamen fear most.

Designing a hull that holds alignment to the wind well but also maintains good stability in following-wave running means achieving a well balance bow draught, which is not at all an easy task.

In designing the W.T.B. our design engineers used a Yamaha-original simulation software called YPDS. This software is programmed to enable rapid calculation of the effect on running characteristics when changes are made in the various elements of the hull design. It was the use of this YPDS software that made it possible to determine the ideal length, depth and thickness for the Wave Thruster Blade design.

The dual advantages of the W.T.B. design

Besides the advantage of creating a hull that stays pointed into the wind when drifting, the W.T.B. design has another significant merit. It also helps soften the shock when the boat hits a wave for more comfortable cruising. In cross-section, the W.T.B. has a "V" shape with quite a sharp angle that serves a shock-absorbing function when it cuts into a wave.

In other words, what Yamaha's design engineers have created with the W.T.B. is a completely new type of hull with the dual merits of softer wave cutting when running and good wind-alignment performance when at drift.

Specifications of the YF-23
Overall length: 7.50m; Overall width: 2.55m; Outboard motor: 4-stroke F100, F115 or twin F80s

WORLD TOPICS

We always welcome your contributions.
Write to Chief Editor Shigeharu Maruhashi of the PR Division,
Yamaha Motor Co., Ltd.
2500 Shingai, Iwata, Shizuoka 438-8501 Japan,
<maruhashis@yamaha-motor.co.jp>

Peru

Expectations High for Sales Growth

The meeting received high praise from participants

A meeting of Latin American distributors of Yamaha Power Products was held in Lima, Peru on July 11. It has been around ten years since a meeting of this type gathered Power Product distributors from all over Latin America. The meeting was attended by personnel from eight regional distributors and a Yamaha Motor Corp. U.S.A. (YMUS) Power Products representative also participated as a guest. After a presentation concerning overall Yamaha operations in Latin America, representatives from Colombia, Peru and the United States presented reports of successes in Power Product business in their respective countries. Also, the brand new inverter type generators "EF1000iS" and "EF3000iSE" were introduced and participants were treated to a hands-on demonstration of the low waveform distortion ratio, quietness and lightweight qualities of these models. These machines are compact and capable of longer hours of continuous running. All agreed that they are sure to set a new standard for next-generation portable generators.

From Hitomi Wada, Outdoor Power Equipment Operations, YMC

Japan

First woman to cross from South Korea to Japan on a WaveRunner


On this endurance run, the new FX140 proved not only its running performance but also its great fuel economy, enabling fewer fuel stops

On August 8, Ikuko Takeda, who runs the "Marine Shop: Navy" with her husband in Fukuoka Prefecture, Japan, became the first woman to successfully complete a solo 200km journey from the South Korean port of Pusan to Hakata in Japan.

Ms. Takeda left Pusan at 10 a.m. under unfavorable conditions with overcast skies and 3-meter waves.


Ms. Takeda arrives tired but triumphant in Fukuoka

After four hours of traveling, things looked desperate, as she faced both refueling problems and squalls on the ocean and at one point had to be towed by a support ship. But she pushed ahead with her journey and arrived in Hakata harbor at 7:25 p.m.

"The toughest part was the first three hours. My hands and shoulders hurt from gripping the accelerator bar and I lost feeling in those areas. I had planned to just enjoy the trip, but the truth is I had to concentrate as best I could."

Her husband Masaya, who was coordinating the journey reflects, "The performance of the WaveRunners and information available about them are excellent. The FX140 (WaveRunner) used for this trip has a fuel-efficient 4-stroke engine and is stable in choppy conditions so I felt pretty confident, but the open sea is a tough environment. We achieved the main goal of this trip, which was interaction with Korean riders, and finished the journey safely. So I consider it a great success."

Vietnam

YMNV expands production to meet growing demand

Yamaha Motor Vietnam Co., Ltd. (YMVN) has expanded its factory facilities and assembly lines in order to double yearly motorcycle production from 60,000 to 120,000 units by November of this year. The company plans to increase production even more in the future, once again doubling its production goal to 240,000 bikes a year within the next two years.

Local production of Yamaha brand bikes in Vietnam began in 1999, making Yamaha somewhat of a latecomer to the country's motorcycle market. This has not stopped the company from becoming a major force in Vietnam. Since the introduction of the "Jupiter" model in November of last year, orders have been rapidly increasing. This trend is expected to gain even more momentum with the government's decision to impose high import tariffs on motorcycles effective 2002. This action has already been responsible for a decrease in the sales of inexpensive bikes made in China and is expected to help Yamaha further increase its market share in the future.


The 102cc "Jupiter" is extremely popular in the Vietnam market

Bicycles by Sparta mounting Yamaha PAS power assist units stood out at the IFMA Cologne 2002 show

Germany

Electric Power-assist Bicycles Spark IFMA Show

Europe's largest annual bicycle industry trade show, IFMA Cologne 2002, was held from September 12 to 15, attracting some 40,000 visitors to the convention center in Cologne, Germany. One of the trends at this year's show was the growing presence of electric power-assist bicycles. Yamaha's electro-hybrid power assist (PAS) units were featured on models by three leading makers, Sparta of the Netherlands and the German makers Kynast and Biria.

Sparta, whose PAS-powered models have already won a strong reputation on the market showed its lineup of updated models with new color schemes and attractive accessories that drew plenty of visitor attention. Kynast won the attention of both bicycle dealers and the general public with its new three-wheeled electro-hybrid cycle designed specifically for the physically challenged that opens up a new realm of applications for electric power-assist technology.

Meanwhile, Biria displayed its PAS-powered bicycle designed specially for use by Deutsche Post mail deliverers. This model brings with it big expectations for the expansion of demand for electro-hybrid vehicles in special-demand niches like this, and other suppliers certainly took notice.

Throughout this year's show, the prominence of electro-hybrid bicycles mounting the Yamaha PAS units as well as units by other makers indicate that big potential lies ahead for these products.

From Norio Kusunoki, RV/PAS/PP Operations, YMENV

USA

Yamaha Pro Hooks BASS Masters Classic Crown

Those who enthusiastically follow bass fishing recognize the BASS Masters Classic as the sport's main event. This prestigious three-day tournament begins with 52 of the sport's top qualifiers fishing against each other for the world-renowned title. For only the third time in BASS Masters history, the same angler led the competition each of the three days on his path to becoming the 2002 BASS Masters Champion. And that angler was Team Yamaha pro Jay Yelas of Tyler, Texas. "This is a thrill of a lifetime for me," Yelas said. "Winning the Classic really makes your career as a professional bass fisherman." Jay not only secured himself the $200,000 top purse but also became the first Classic champion ever to also win big-bass honors on all three days. In this tournament, Yamaha was also a big winner. The Yamaha outboard booth at the Birmingham Convention Center alongside the Skeeter boat booth was full of visitors throughout the competition pursuing autographs from Team Yamaha and Team Skeeter anglers. By the third and final day, the Yamaha blue and white hat and Yamaha number one foam fingers had become the must-have item for the fans. This was Yamaha's first win in the BASS Masters Classic since 1994 and the coverage that this top tournament received on sports channels like ESPN has given Yamaha outboards fantastic media exposure.

The BASS Masters Classic victory brought big smiles and lots of attention to the Yamaha/Skeeter team

From Dale Barnes, Marketing Manager, Marine Power Div., YMUS

Japan

Riding Tour to Japan

Malaysia's Hong Leong Yamaha Virago Club (HL Yamaha) members took a trip to the "land of the rising sun," Japan. It was the first trip to Japan since 1992 for the Malaysian group of shop owners who have also had several adventurous riding experiences in Europe, ASEAN nations and in New Zealand in the millennium year 2000.

Yamaha dealers at the CP before setting off on the tour

HL Yamaha worked closely with their Japanese counterparts from Yamaha Motor Co., Ltd. (YMC) to schedule an interesting 8-day, 7-night trip from August 31 to September 7, 2002.

The first day started with an orientation on the traffic rules and riding conditions before three riding groups and their marshals set off on their machines, which ranged from 250cc to 1300cc and included the T-MAX and R1s.

During the next few days, the group rode to Mt. Fuji, sampled the grapes at Japanese vineyards and drove through the countryside to get a look at Japanese farmlands. Their evenings were spent dining on local delicacies and enjoying the world-famous Japanese hot springs. After visiting the city of Gifu on the fifth day, they arrived YMC's hometown, Iwata, and took a tour of Yamaha's Communication Plaza and the motorcycle factories.

The end of the trip was spent with group members golfing, sightseeing or just enjoying their free time. A farewell dinner was held at hotel Tsumagoi together with their YMC counterparts. Tokens of appreciation were extended to all marshals from YMC for their time and efforts, and the group returned home discussing their next adventure destination.

From Teoh Kam Weng, Sales Manager, HLYD, Malaysia

Fiji

"XJ900P" police bikes on duty at ACP Summit

Local television news and newspapers covered the riding school

On July 12, ten "XJ900P" bikes arrived in Fiji to be used as security and escort bikes at the ACP (Africa, Caribbean and Pacific) Summit which Fiji hosted. As part of the preparations for this event, Yamaha conducted a YRS (Yamaha Riding School) program on July 6 at the request of the Fiji Police Force. The purpose of this program was to introduce these new-model bikes to the officers on the force and help them become familiar with the machines. In all 15 highway patrol officers participated in the riding school, including the country's first female officer. Significant improvement was clearly visible in the riding skills of the officers due to their hard work. The event drew quite a bit of attention from local media as well as the law enforcement agencies involved.

From Yuko Iida, OMDO, YMC

WORLD TOPICS

Africa

OMDO Programs Extend Product Life in Africa

In Africa, YMC's Overseas Market Development Operations (OMDO) is getting tangible results from programs designed to make sure customers use their Yamaha outboard motors in top condition for as long as possible.

Quality after-sale service is of course one of the keys. From July 1 to 5, a comprehensive service training seminar was held in Cameroon for distributor service representatives from six West African nations. Being the third such seminar, following ones in 1995 and '98, the aim is to raise the overall level of service expertise by training on models like the E75B outboard used by the region's fishermen.

Hands-on training in servicing an E75B outboard motor

Another important factor affecting product life is the quality of engine oil and spare parts used. This is especially true in Africa where lower quality substitutes are often used. In Mauritania, where coastal fishery for octopus is booming, the local distributor, Groupe Mauritaninne des Industries de Pêche (MIP), succeeded in proving the value of genuine Yamaha engine oil by opening three fuel stations that sold outboard fuel premixed with Yamalube oil. The fishermen soon discovered they were getting longer life from their spark plugs and pistons. Beginning this year, dealers in Algeria are giving away Yamalube to purchasers of Yamaha outboards and the customers are already appreciating the difference.

OMDO has also discovered that cooperating with the Parts Dept. in selling kits containing the most often replaced expendable parts is a good way to make sure customers use genuine Yamaha parts. Because it is a kit, the price per part is cheaper, and it also encourages the users to replace all worn parts regularly.

From Yukihiro Abe, Service Group, OMDO, YMC

Japan

The "2nd Club Yamaha Motorcycle Meeting" draws 500 members nationwide

Yamaha user groups exist all over the world, and "Club Yamaha Motorcycle" is a program specially designed by Yamaha Motor Marketing Japan Co., Ltd. for Yamaha bike owners. The program's big annual event, the "2nd Club Yamaha Motorcycle Meeting" was held on Sunday, September 29 in Fukuroi City, Shizuoka prefecture at the Yamaha test course, drawing a total of 500 participants from all over the country.

The attendance at this year's event exceeds last year's turnout, probably due to greater member awareness since this is the 2nd annual event, as well as the fact that some participants had come from the "Yamaha Club Meeting," an event organized by the Yamaha Owner's Club, which was held the day before.

500 members of Club Yamaha Motorcycle gathered for the big annual get-together

Many guests, such as Takafumi Fujimori, manager of "Club Yamaha Motorcycle Racing" who won the X-Formula class at this year's Suzuka 8-hour endurance race, as well as current factory leaders, took part in talk shows, charity auctions and demonstrations such as a track run with the YZR-M1 factory racer and a trial riding demo. To end it all, a parade was held on the home turf of Yamaha, the Fukuroi "Yamaha course." All in all it made for an extremely enjoyable autumn day.

About 200 Yamaha bikes took part in the closing parade

Colombia

Getting to the Heart of Yamaha Brand Policy

Incolmotos employees saw the video "Winning Brand Yamaha" and then a demonstration by team Yamaha motocorss riders

On August 2, over 150 employees of Colombia's Yamaha distributor and manufacturing base, Industria Colombiana De Motocicletas Yamaha S.A. (Incolmotos), gathered at the company's assembly plant in La Estrella, Antioquia to take part in a special event aimed at increasing awareness of the brand strategy Yamaha is now promoting worldwide under the theme of "Touching Your Heart." In his speech to the employees, Incolmotos President, Dr. Francisco J. Sierra, stressed the importance of the Yamaha corporate philosophy of "We Create Kando" and the goal of surpassing customer expectations in all aspects of the company's activities, from the quality Yamaha motorcycles Incolmotos assembles to the services it offers. He also stressed that Yamaha means passion and the spirit of challenge, and encouraged every employee take on the new challenges that will be necessary to keep the Yamaha brand No. 1 in Colombia. After this, the theme of challenge was carried on in a showing of the YMC-supplied video "Winning Brand Yamaha" and in a demonstration of motocross riding techniques by star riders Juan David Posada and Sebastián Vélez of the winning Incolmotos team on a special course set up next to the factory. The employees were also encouraged to submit statements about when they feel passion in their work.

From Claudia Ruiz, Communication Department, Incolmotos, Colombia

Mr. Yoshida smiling while receiving the trophy

France

Shigeru Yoshida visits France

Mr. Yoshida and his Royal Star Classic being warmly welcomed by YMF staff

It was 35 years ago that Shigeru Yoshida made his trip around the world on a YDS-3. As reported in Yamaha News #4, Mr. Yoshida has set off on yet another trip around the world. He wanted to set foot in Russia, a country in which he was denied entry to on his first odyssey. France was another of the many stops on his journey.

It was on September 3 that Mr. Yoshida visited Yamaha Motor France S.A. (YMF). Preceding this visit, he arrived at his long-desired destination at the border of Russia and Finland on August 10. Next, he spent about one month riding through Germany, the U. K. and other European countries. Even after this long journey, Mr. Yoshida showed no signs of fatigue, which he attributes to the riding ease of his 1997 Royal Star Classic. The staff of YMF welcomed him with a huge ovation.

Yoshida then met with Mr. Olivier, President of YMF, and they chatted about the four years of preparation for this trip and the problems and many events which occurred during the journey. Mr. Olivier also strengthened the bond between YMF and Yoshida by presenting him with a trophy which was inscribed with the motif of Yamaha's "tuning fork" brand symbol.

Yoshida left lasting impressions at YMF, where he spent some pleasurable days before departing for the Netherlands, his next destination.

From Claudine Maffiolo, YMF, France

Indonesia

Indonesia hosts the 2002 "Global Train the Trainer–Silver Level"

From August 19 to 23, a Yamaha Technical Academy (YTA) "Global Train the Trainer – Silver Level" seminar was held at Indonesia's Yamaha distributor PT. Yamaha Motor Kenkana Indonesia (YMKI). This seminar aims to train service technicians to become service instructors under the "Global Train the Trainer" program begun in 2000 as part of Yamaha's YTA program, which is for training Yamaha Service Staff internally. Instructors graduating from this Academy go on to become YTA-certified instructors who can in turn train new instructors in their own and neighboring countries as well as organizing educational activities like service mechanic contests.

The 14 participants, after enjoying their studies

The Academy adopts a five-level system—bronze, silver, gold, platinum and diamond—so the participants can advance through the program based on their individual level of technical expertise. The first Bronze Level seminar held in Japan last year was a big success, attended by 12 technicians from ten countries. The Silver Level seminar held this summer at YMKI in Indonesia was taught by two invited instructors, one from Yamaha Motor Australia Pty. Ltd. and the other from Zhuzhou Nanfang Yamaha Motor Co., Ltd. with eight participants from six countries and three instructors from three countries.

Over the five-day seminar, the participants received advanced levels of instructor training in the fields of 2-stroke and 4-stroke use, troubleshooting and CS (Customer Satisfaction) theory. Besides the seriousness of the instructors and trainees, this year's seminar was successful thanks to the cooperation of the YMKI service staff in providing service facilities and equipment.

In the intent expressions of the trainees and instructors one could see the undying efforts of Yamaha servicemen around the world to be "No. 1 in Customer Satisfaction."

From: Kosei Ito, Service Div., Motorcycle Operations, YMC

Nigeria

YRS for Nigerian Police and Other Organizations

As part of its corporate efforts to heighten customer satisfaction and contribute to the society with traffic-related customer education, Nigeria's Yamaha distributor and manufacturing base, Yamaha Manufacturing Nigeria Limited (YMNL) recently organized a 3-day Yamaha Riding School (YRS) clinic in cooperation with Yamaha Motor Co., Ltd. (YMC) Japan. The roughly 80 participants were drawn from a wide range of YMNL motorcycle customers including corporations, individuals, the Nigerian Police, the Lagos State Management Traffic Authority, the Federal Road Safety Corps and the Professional Riders Association. The main focus of the clinic was reducing accidents and improving road safety in Nigeria by giving the users instruction in the latest riding techniques and defensive-riding strategies. YMC's own riding instruction specialist, Mr. Toh, led the course, which included training in riding styles, precautionary measures and traffic rules and regulations. In addition to this training, the participants were also given educational materials including handbooks and instructional aids.

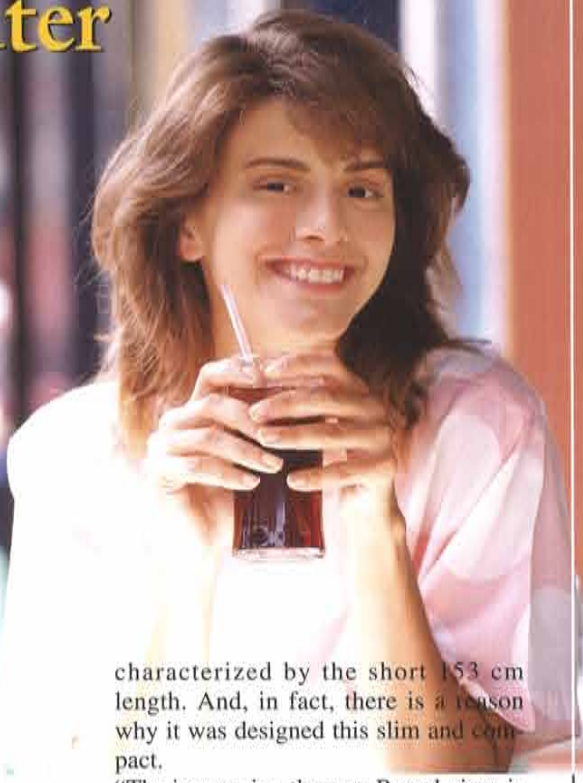
At the end of the three days it was clear to all that the participants had gained a lot of valuable new knowledge and experience.

From: S. Ikeotuonye, National Marketing Manager, John Holt Plc, Nigeria

Participants ready to their training

The Electric Commuter "Passol"

There's a reason for its cute design



This November, Yamaha Motor is introducing on the Japanese market an entirely new electric-powered commuter bike mounting a lithium-ion battery that boasts the world's highest level performance and a specially designed super-thin power unit on an aluminum frame. A preliminary shipment of 500 units of the new Passol will be sold in selected parts of the Tokyo metropolitan area. This new "zero-emissions" vehicle uses clean electric power and is characterized by its quiet, light ride.

"In our product planning, we wanted a commuter with an enjoyable ride that was somewhere in between an engine-powered 50cc scooter and an electro-hybrid bicycle but different from them both," says Ms. Mami Ishibashi of the product-planning team." Taking a different approach from other bikes in the past, we chose to build a model with an image that placed importance on a slim design rather than storage and carrying space, light handling rather than running range, a pleasant body fit rather than machine form and a smooth ride rather than sharp acceleration," she adds. The result is a bike that is sleeker, easier to handle, pleasanter fitting and quieter than a conventional 50cc scooter.

In terms of performance, it was given a running range of 32 km (at 30 km/h constant speed) with the aim of satisfying the needs of short- range urban use. A large number of aluminum parts were used to keep the bike's weight down to just 44 kg, while the overall design is characterized by the short 153 cm length. And, in fact, there is a reason why it was designed this slim and compact.

"The impression the new Passol gives is one of a bike that rises up tall and slender. The seat has been designed to give the pleasant feeling of sitting up on a stool, rather than the feeling of sitting down in a chair that you get with a scooter. And, the position of the footrests has been made 5 to 10 cm lower than on conventional scooters. This creates a more upright riding position with less knee bend that naturally encourages a straighter, upright posture in the backbone. With that straight posture you look much better as you ride," continues Ms. Ishibashi. With a straighter back you breathe more deeply, and that fits perfectly with the zero-emissions Passol.

The Passol is Yamaha's proposal for a new type of 21st-century minimum commuter that realizes one of the important strategy goals of YMC's "Next 50" new midium-term management plan adopted in April of this year; namely as the embodiment of the plan's "Alternative Power Source Strategy," which is one of the development categories in the "Promoting a Growth Strategy Promotion" that constitutes one of the four main plan directions.

YAMAHA MOTOR CO., LTD. Public Relations Division 2500 Shingai, Iwata, Shizuoka, 438-8501 Japan
Telephone: 81-538-32-1145, Facsimile: 81-538-37-4250
http://www.yamaha-motor.co.jp
Printed in Hong Kong