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Grudge Match

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Honda and Yamaha compete on Mississippi's Gulf Coast for the ultimate four-stroke bragging rights

By Bruce W. Smith
and Jim Barron

Photos by Bruce W. Smith



Grudge Match

The rivalry between Honda and Yamaha is intense, born of fierce corporate competition not only in the U.S., but around the world.

So in the eyes of these two companies, every outboard comparison test carries high stakes. For this test, the stakes are even higher. Honda and Yamaha are the only two companies with V-6 four-stroke outboards — both offering 200 and 225 hp versions that were introduced last year.

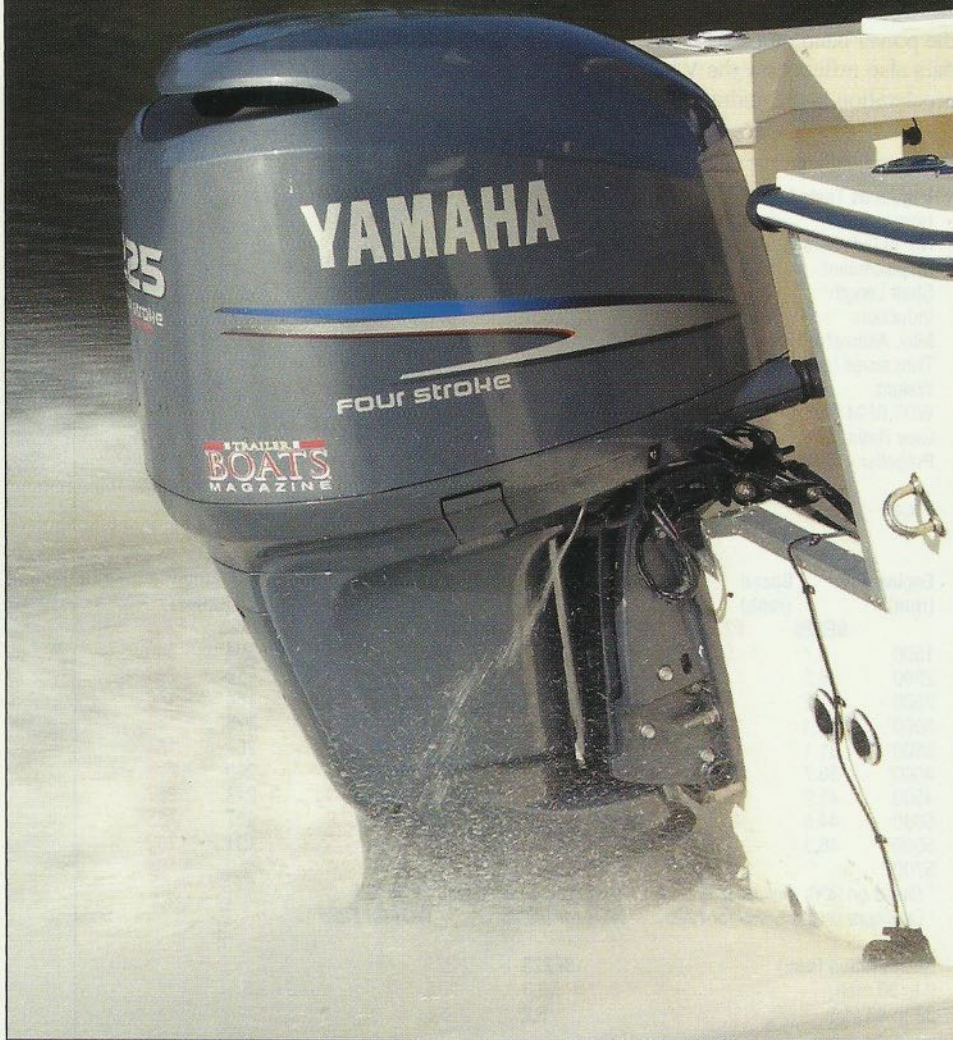
So, when we broached the concept of comparing the new 225 hp four-strokes, e-mails and phone calls from both sides flew furiously in our direction. Among the concerns: Yamaha wanted to make sure Honda didn't send a pre-production or

souped-up engine; at the same time, Honda wanted to make sure the boat chosen was not from a Yamaha-owned company such as Century or Cobia.

To address these issues, we picked both 25-inch-shaft engines from Mississippi Gulf Coast dealers, where the comparison tests were held. Yamaha's F225 came from

River City Marine in Moss Point, while the Honda BF225 engine was pulled from Ocean Marine Group in Ocean Springs.

We also choose a test boat that neither manufacturer had much, if any, experience with — Ken-Craft's new Challenger 215. It came from Crown Leisure Marine in D'Iberville. Rated for single-engine applications up to 250 hp, this 21½-foot center console has a modified-V hull with 18 degrees of deadrise at the transom and a dry weight of 2750 pounds. Loaded with 90 gallons of fuel, three crewmembers, safety equipment and test gear, the boat weighed 4050



the high-profile lobe) to the outer pair. That change instantly increases the air/fuel charge and consequently boosts horsepower and torque by about 20 percent.

The BF225 uses a small-diameter, long-stroke block configuration with a 9.4:1 compression ratio to build low-end torque. A header system sweeps each bank's exhaust around the outside of the block.

The Honda has a dual-path, two-stage induction system. Air enters at the top of the cowl. At rpm below 4000, air is routed the long way around the air-intake plenum to the cylinders. When the engine crests 4000 rpm, however, a pair of butterfly valves in the intake plenum opens, allowing the air to take a more direct route. The BF225 has a 1.86:1 gear ratio and develops its peak horsepower rating at 5700 rpm.

Another difference between the Honda and Yamaha is the design of the lower units. Both have 5-inch-diameter gearcases, but a close look reveals that Yamaha's is sleeker than Honda's. The Honda lower unit is a little more blunt at the leading edge, and its water intake creates more turbulence along the sides of the bullet.

To see how much each engine weighed, we hung each one from a certified scale. (See sidebar.)

Before testing began, we set aside time for each manufacturer to rig the boat and prop the engine. As it turned out, both engines were mounted on the third hole from the top, setting the propshaft 7 inches below the hull.

In propping, Yamaha chose to run its 14 $\frac{1}{2}$ x21-inch Pro V three-blade stainless wheel, while Honda opted for Mercury's

pounds, sans outboard. We used the same boat for both engines.

Finally, to be sure neither company somehow planted a "ringer," we ran both engines on a dynamometer to determine the true horsepower output. More on this later.

Our test site at Gulfport Lake on the westernmost end of Biloxi's Back Bay is the same location we have used for tests in years past. It has a good launch ramp, minimal boat traffic, wind protection and little or no current.

MEET THE PLAYERS

Both 225s comply with the U.S. Environmental Protection Agency's outboard emissions mandates for 2006, as well as the California Air Resources Board's 2004 Tier II requirements. In fact, Honda's BF225 meets California's stringent 2006 Tier III mandates.

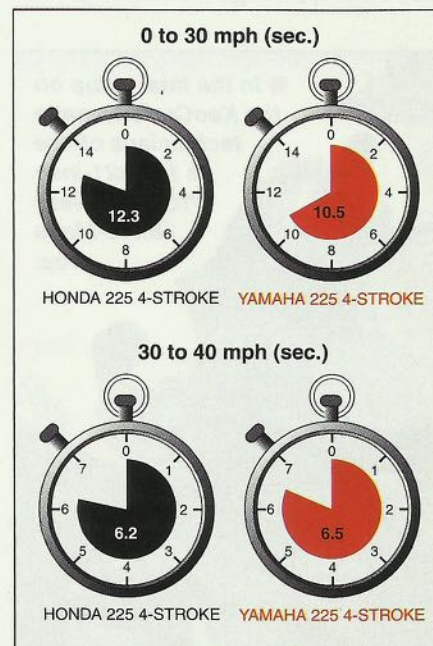
Yamaha's F225 features a fuel-injected, 60-degree 3.3L powerhead with a belt-driven dual-overhead-cam (DOHC), 24-valve configuration and a 9.9:1 com-

pression ratio. It has a large-bore, short-stroke block that helps it to rev up quickly.

In a reversal of conventional thinking, its exhaust manifold runs through the center of the V-block, while long-track intake runners sweep around both sides of the block from the front of the cowl back to each cylinder. The intake tubes are designed to enhance low-end torque. The Yamaha has a 2.00:1 gear ratio and a peak horsepower rating at 6000 rpm.

Honda took a slightly different tack. The BF225's 3.5L fuel-injected, 60-degree powerhead has 24 valves, but with a single-overhead cam utilizing Honda's Variable Valve Timing and Lift Electronic Control (VTEC) — the same technology found in the current Acura MDX and Honda Odyssey automotive engines.

VTEC utilizes three rocker arms and cam lobes operating two intake valves. The outside pair of cam lobes has mild lift up to 4500 rpm, at which point the computer engages a hydraulic system inside the valve train that locks the middle lifter (it runs on



Grudge Match

15½x19-inch three-blade stainless Mirage. Unlike Yamaha, Honda does not make its own stainless props. Instead, it uses wheels from Mercury, Precision, PowerTech and Solas.

If you are wondering why Honda used a larger diameter prop, it goes back to the hydrodynamics of the gearcase: A bigger wheel is needed to capture clean water as it flows around the lower unit.

ACCELERATION TESTS

Once each manufacturer was satisfied with the setup, we began our testing by making three runs to get the computer-aided Stalker radar figures for holeshot (0-to-30 mph) and midrange (30-to-40 mph) acceleration. Then we made runs in both directions across the bay to obtain fuel consumption, boat speed, rpm and sound readings. We used a Garmin GPS (verified with our handheld Stalker radar gun), Flo-Scan fuel-flow meter, and a digital decibel meter. Each set of numbers was averaged for the final data you see here.

When it came to acceleration, Yamaha averaged 10.5 seconds in the 0-to-30 mph sprints, while Honda took 12.3 seconds. However, in the 30-to-40 mph segments the Honda emerged victorious with a 6.2-second elapsed time, compared to Yamaha's 6.5 seconds.

These numbers reflect how Yamaha's lower geared engine, smaller diameter prop and wider rpm range enable it to get into

the power band quicker than Honda's higher gear ratio with a larger diameter prop. The data also reflect how the VTEC system helps the Honda outboard build revs and boost acceleration in the midrange. ►

Engine as Tested	Honda BF225	Yamaha F225
Horsepower:	225	225
No. of Cylinders:	V-6	V-6
Displacement:	3.5L/212 cid	3.3L/205 cid
Shaft Length:	25"	25"
Induction:	EFI w/ SOHC VTEC	EFI w/ DOHC
Max. Alternator Output:	60 amps	45 amps
Trim range (degrees):	-4 to +16	-4 to +18
Weight:	(see sidebar)	(see sidebar)
WOT RPM Range:	5000-6000	5000-6000
Gear Ratio:	1.86:1	2.00:1
Propeller:	Mercury Mirage 15½" x 19" 3-blade stainless	Yamaha Pro V 14½" x 21" 3-blade stainless
Price:	\$17,400	\$17,440

Engine (rpm)	TEST RESULTS							
	Speed (mph)		Fuel				Range ¹ (miles)	
	BF225	F225	(gph)		(mpg)		BF225	F225
1500	6.7	6.3	1.5	1.7	4.5	3.7	364	300
2000	8.2	7.8	3.0	2.6	2.7	3.0	219	243
2500	11.2	8.8	5.9	4.8	1.9	1.8	154	146
3000 ²	25.1	10.0	7.3	7.0	3.4	1.4	275	113
3500	31.1	14.8	9.3	7.6	3.3	1.9	267	154
4000 ³	36.7	29.4	11.5	8.5	3.2	3.4	260	275
4500	41.2	36.9	13.8	11.0	3.0	3.3	243	267
5000	44.5	42.8	16.0	14.6	2.8	2.9	227	235
5500 ⁴	46.3	47.1	19.1	19.1	2.4	2.5	194	202
5700 ⁵		47.8		19.6		2.4		194

¹ Based on 90% fuel capacity

² Optimum cruise speed for BF225

³ Optimum cruise speed for F225

⁴ WOT for BF225

⁵ WOT for F225

Acceleration (sec.)	BF225	F225
0 to 30 mph	12.3	10.5
30 to 40 mph	6.2	6.5

Honda Marine, Dept. TBM, 4900 Marconi Drive, Alpharetta, GA 30005; 800/426-7701; honda-marine.com

Yamaha Marine, Dept. TBM, 1270 Chastain Road, Kennesaw, GA; 800/526-6650; yamaha-motor.com



■ In the final setup on the KenCraft, Yamaha technicians chose a 14½x21-inch Pro V stainless three-blade prop.

SOUND CHECK

Four-stroke outboards not only perform differently than their two-stroke brethren, they also have their own sound. It's not just the level of the sound, but the tone. It's much more muted at the lower rpm and throatier at the upper end. Interestingly, there's also a difference between the sound of the Honda BF225 and Yamaha F225 four-strokes.

As outlined in the chart below, the Yamaha was a few decibels (dBa) quieter than the Honda throughout most of the rpm range. The hard-surfaced hull and liner of the KenCraft acted as a soundboard, magnifying small nuances in the engine's tone and vibration.

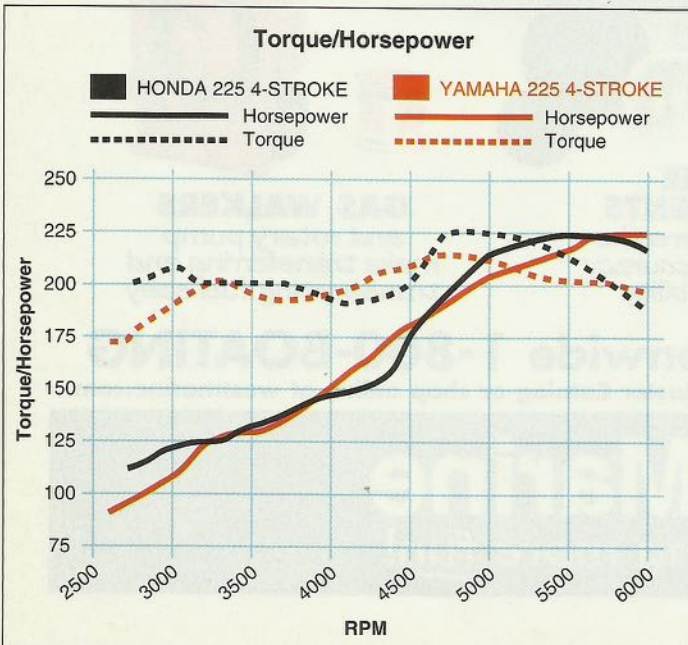
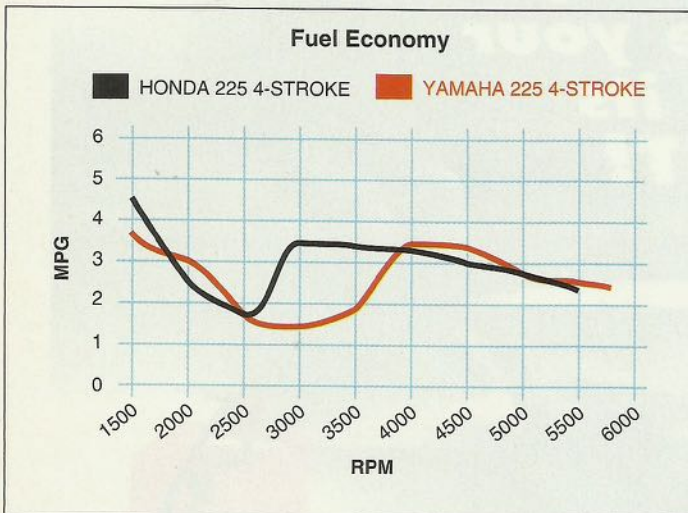
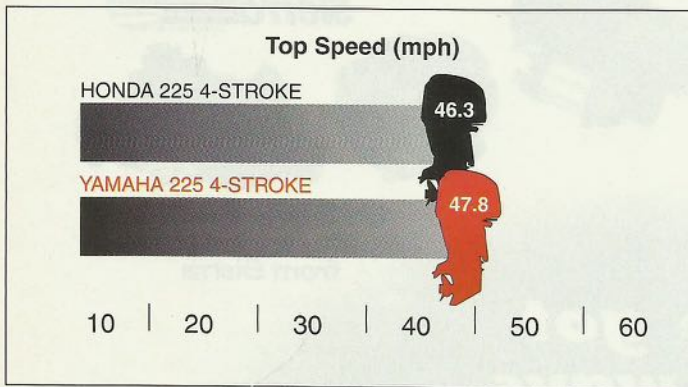
Honda's engine displayed distinct areas of added sound, including gear whine at lower rpm and a deepening tone when the intake tract changed and VTEC kicked in at 4000 and 4500 rpm, respectively.

SOUND MEASUREMENTS (dBa)	BF225	F225
Idle at helm (750 rpm):	64	63
Idle at transom (750 rpm):	66	64
Cruise at helm (3000/4000 rpm):	88	89
WOT at helm (5500/5700 rpm):	99	97

Grudge Match

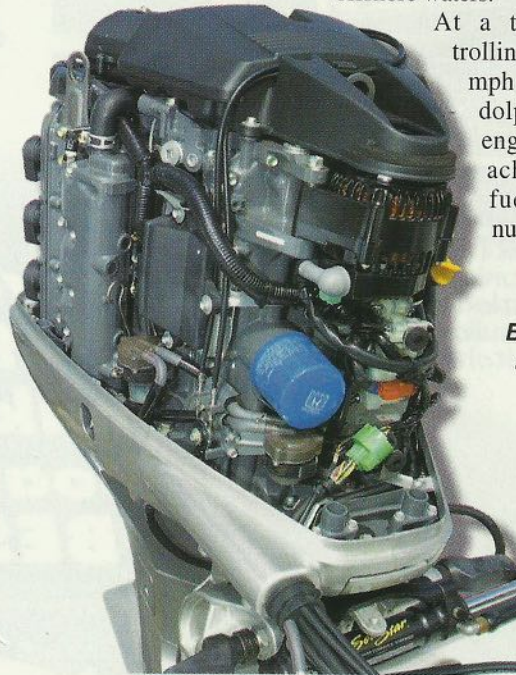
FUELING THE DEBATE

Our fuel efficiency testing revealed interesting results. The Honda and Yamaha posted identical optimum mileage figures (3.4 mpg),



but did so at different engine and boat speeds. Honda's BF225 planed out early, achieving its optimum cruise at 3000 rpm and 25.1 mph. Yamaha's F225 achieved its optimum cruise at 4000 rpm and 29.4 mph.

However, on the KenCraft Challenger 215CC, the Yamaha achieves its best fuel economy in a relatively narrow rpm band and at comparatively high speeds for the ocean or Great Lakes. The Honda, on the other hand, posts good fuel economy numbers over a broader rpm range and at speeds better suited to cruising offshore waters.



At a typical lure-trotting speed of 8 mph for tuna and dolphin, the two engines seem to achieve similar fuel economy numbers, though

■ **The Honda BF225 features a powerful 60-amp, belt-driven alternator, mounted in front of the powerhead, as is the oil filter.**

GRAVITY GAMES

To determine the true weight of the new V-6 four-strokes from Honda and Yamaha, we enlisted the help of Alabama Scale & Instrument (251/660-9999) in Mobile. They set us up with a portable electronic scale, calibrated and certified to within a half-pound.



Specifications in the outboard companies' respective brochures list Honda's 25-inch-shaft BF225 at 599 pounds, while Yamaha's 25-inch-shaft F225 is 583 pounds.

However, each of these is a "dry" weight that does not include engine oil, gear oil, transom hardware, propeller or prop hardware. When these rigging items are included, weights increase significantly.

On our digital scale, the "wet" Honda weighed 638½ pounds, while the Yamaha came in at 632½ pounds. That 6-pound advantage in favor of the Yamaha is less than the weight of three quarts of oil.

Most revealing is the difference between the actual weights and the brochure weights, amounting to nearly 40 pounds for the Honda and 50 pounds for the Yamaha.

FOUR-STROKE V-6 WEIGHTS (lbs.)

	HONDA BF225	YAMAHA F225
Published in Brochure:	599.0	583.0
Rigged to Run:	638.5	632.5

Grudge Match

this is somewhat extrapolated, since we tested at rpm points rather than boat speeds. Wide-open-throttle fuel economy ended in a dead heat with both engines getting 2.4 mpg.

POWER AND SPEED

Who was faster? In this test, it was the Yamaha F225, with a top speed of 47.8 mph at 5700 rpm. Honda's BF225 achieved 46.3 mph at 5500 rpm. The results surprised everyone — including Yamaha personnel, who believed that the Honda would be faster.

The results surprised us because our dyno testing told another tale. We used a Land & Sea Dynamite dynamometer to measure propshaft torque and horsepower through a computer-controlled run beginning at 2500 rpm and ending at 6100 rpm.

As indicated earlier, we did this to determine if either engine had a disproportionate horsepower advantage. The dyno showed that both engines were stock and dead equal. Honda emerged with 224 hp at 5700 rpm, while Yamaha pumped out the same ponies at 6000.

■ *Yamaha's individual long-track intake runners sweep from the front of the powerhead back to each of the cylinders. Exhaust is routed down between the heads.*



However, each engine reaches its maximum horsepower and torque in a different way. The Yamaha does so in a very linear fashion, coming into its power around 4400 rpm. Maximum torque is achieved between 4700 and 4900, with maximum horsepower coming just before the rev-limiter kicked in at 6100.

On the other hand, Honda's larger displacement comes on strong right from the get-go, out-pulling the Yamaha by some 30 ft.-lbs. and 17 hp by the time rpm

reached 2800. Honda leads the power race until rpm climb to 4000, at which point the Yamaha catches up.

That's also about the same time the Honda literally gets its second wind. When the tach hits 4000, the air intake changes to the direct route, ramming more air into the cylinders. At 4500 rpm, the high-lift cam lobes come into play, supplying the engine with a healthier fuel charge. This combination instantly jumps the Honda's horsepower 33 points and adds another 29

Control your attitude!

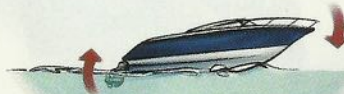
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Where the Honda pulls more than 200 ft.-lbs. of torque from 2800 to 3700 rpm and again from 4600 to 5800, Yamaha is barely able to counter between 4200 and 5800. As for the horsepower race, again Honda is able to sustain a little more power during longer rpm sweeps, even though both engines top out at 224 hp. In other words, the dynamometer showed that the Honda had a slight edge. Yet, where metal meets water, the Yamaha prevailed in acceleration and top speed. And much of this has to do with lower unit design and propping.

Four-stroke outboards have been difficult to prop. What works well on a two-stroke does not necessarily work well on a four-stroke, and so manufacturers are still in a learning curve. Many four-strokes accelerate better with a smaller diameter wheel that allows more prop slip, so the engine can rev quickly into its power zone. However, Honda's BF225 gearcase requires a large diameter prop to prevent ventilation at higher speeds. Off-the-line acceleration suffers as a result. The good news is that Honda is working on streamlining its gearcase with the goal of converting its torque into better performance.



■ *In comparing the lower units, Yamaha's gearcase and water pickup (right) are a tad more streamlined than Honda's. As a result, Yamaha can run a slightly smaller diameter prop, and this enhances its holeshot.*

PICKING A WINNER

The fun part about engine comparisons is learning something new. This test was no different. For instance, we found that the

Yamaha has a few degrees more positive trim angle, which helps lift the bow, resulting in the potential for greater top speed. However, this is more beneficial on

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lightweight boats. On the relatively heavy KenCraft Challenger 215 V-hull, it had little effect.

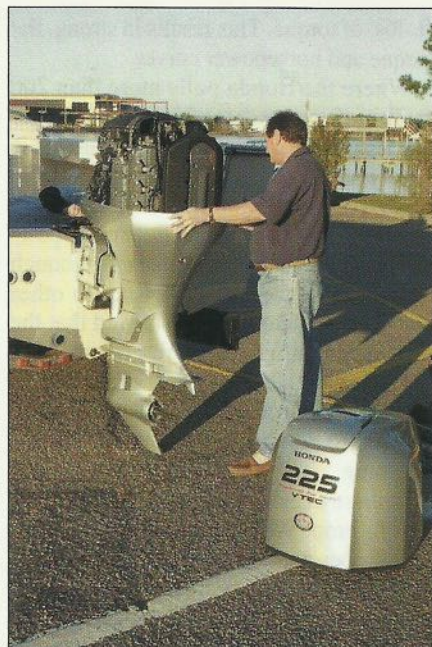
The Yamaha can also spin a smaller diameter prop, which results in quicker

holeshots than its arch rival, at least in this test.

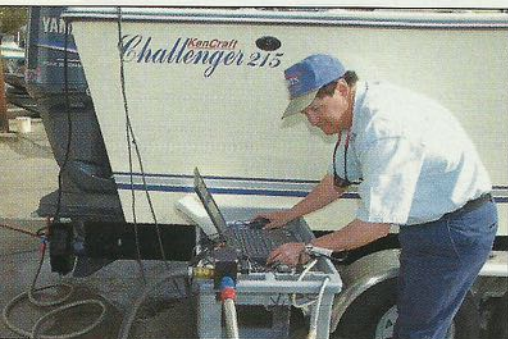
On the other hand, Honda's use of VTEC dramatically improves the engine's power curve to boost mid- to upper-rpm acceleration and throttle response. The switch between the mild and high-performance modes is both visceral and quantifiable.

At the same time, both engines are smooth and efficient in their operation. Their weights are nearly identical, their numbers overlapping in many areas. That alone makes picking a clear-cut winner difficult.

If midrange power, fuel economy and cruising range are important, Honda's BF225 should be substantially more efficient in a variety of sea conditions on this type of boat. Yet, if you are more concerned with speed, Yamaha's F225 should offer stronger holeshot and greater velocity at wide-open throttle. And with that, we call this grudge match a draw. 🍷



Both four-strokes ended up in the third hole from the top on the transom bracket, setting the propshaft 7 inches below the hull.



■ The V-6s were tested on a dynamometer to determine the true horsepower output. Both topped out at 224 hp, although the torque curves were quite different.

OUR TEST PLATFORM

KenCraft's Challenger 215 center console derives much of its character from the company's commercial boat line. The design of this 21½-foot fiberglass fishing boat is simple and classic. There is a nice flare to the bow, generous freeboard and straight lines to a squared-off transom. With



an 8-foot, 2-inch beam, the hull design incorporates a modified-V with 58 degrees of deadrise at the cutwater that eases to 18 degrees at the transom. The sharp entry parts the waves without pounding and the flatter planing surface aft enhances efficiency, stability and load carrying ability.

The fully molded interior is equally basic. There is an anchor locker in the forepeak and a raised forward casting platform. Three storage compartments under the platform are guttered to keep water out. They also drain overboard, and serve

double-duty as fish lockers. Rod storage is provided under the gunwales, and there are gunwale-mounted trolling rod holders.

The console is wide enough to provide moderate protection for two behind the tinted windscreen. Our test boat was fitted with an optional T-top, and its supports supplied excellent handholds for those standing behind and beside the console. The T-top contains an instrument box and five rocket launchers. Hydraulic steering is standard, as are two captain's chairs. Our test boat, however, featured a leaning post with a built-in 30-gallon circular bait tank. A 90-gallon fuel tank is mounted under the cockpit sole.

In each stern quarter is storage for batter-

KENCRRAFT CHALLENGER 215

Length:	.....21' 5"
Beam:	.....8' 2"
Construction:	.....Fiberglass
Deadrise at Transom:	.....18 degrees
Draft (w/ engine down):	.....32"
Weight (hull only):	.....2750 lbs.
Max. HP:	.....250
Fuel Capacity:	.....90 gals.
Base Price	
(w/o engine or trailer):	.....\$17,845
Price as Tested	
(w/o engine or trailer):	.....\$21,875

KenCraft Mfg., Dept TBM, 4155 Dixie Inn Road, Wilson, NC 27893; 252/291-0271; kencraftboats.com

ies and the oil reservoir. A 6-inch-diameter rigging tube leads from the starboard stern quarter to the console.

The Challenger 215 is conservative in style, solid in construction, basic in amenities and competent in performance. These are features we like, and this center console brings it all together in a package designed to please serious fishermen.

— Jim Barron