



Folding Prop Vs. Fixed

Last June, leading sailing editors from the Swedish magazine *Batnytt* and German magazine *Yacht* gathered in Stockholm, Sweden, to put a Gori folding propeller to an exhaustive on-the-water sail and motor trial. The tests were run on two identical Jeanneau 39i sloops, which were brand new and equipped with 39-horsepower Yanmar diesels and the same transmissions.

Michael Wood from *Yacht* and Elias Johansson from *Batnytt* fitted one of the Jeanneaus with a fixed, 17-inch, three-bladed prop and the other with a folding, three-bladed 18-inch Gori—both props were sized

according to the engine manufacturer's approved specifications.

With the props installed, the two Jeanneaus were launched for the trials. Both boats were equipped with GPS, highly accurate tachometers and decibel meters so the test results could be as accurate and impartial as possible.

It was a lovely sunny day in the waters off Stockholm. The breeze was a steady 6 knots, sea calm and sky clear.

STARTING, STOPPING & REVERSE

The teams wanted to get an empirical feel for how well the two

types of props performed when starting and stopping the Jeanneaus. Side by side the helmsmen simultaneously applied full throttle and drove the boats forward until they had achieved maximum speed. The fixed propeller and the folding Gori both delivered the same amount of acceleration while the fixed prop seemed to have slightly more top end speed. But that's what the scientific trials would demonstrate more accurately.

Side by side the helmsmen threw the engines and props into reverse to perform "crash" stops. The folding propeller stopped the 39 footer noticeably faster (12 seconds) than

European sailing editors pit a Gori folding propeller against a traditional fixed-bladed prop in an on-the-water test

Jeanneau 39i Performance with Yanmar 3JH4E

Engine rpm	Fixed/shaft rpm	Gori Folding/shaft rpm	Gori Overdrive/shaft rpm
1800	5.9 kn./ 773	5.7 kn./ 758	6.2 kn./ 753
2000	6.4 kn./ 844	6.0 kn./ 842	6.9 kn./ 845
2200	6.8 kn./ 933	6.6 kn./ 934	7.4 kn./ 927
2400	7.2 kn./1009	6.8 kn./1010	7.8 kn./1011
2600	7.5 kn./1093	7.2 kn./1092	8.2 kn./1094
2800	7.7 kn./1173	7.5 kn./1175	N/A
3000	8.1 kn./1273	7.8 kn./1270	N/A
3160 Max.	8.2 kn./1339		
3167 Max.		7.9 kn./1342	
2626 Max			8.2 kn./1113

the fixed bladed prop (13.8 seconds). This is not surprising since the folding Gori presents the same hydrodynamic configuration in both forward and reverse, i.e. the curved leading edge of the blades leads in both directions as the prop pivots through 180 degrees from forward to reverse.

In reverse, the folding prop demonstrated better acceleration and speed. Interestingly, the fixed prop created a significant amount of "prop walk" in the direction the prop was turning while the folding prop created very little prop walk and was easier to steer straight as the boats backed.

SIDE BY SIDE

The central purpose of the prop tests was to determine how the two types of props performed side by side at exactly the same revolutions. With the auxiliary tachometers mounted on the prop shafts and the GPS reading true over-the-bottom boat speed, the editors were able to develop data that would demonstrate which of the props performed best. To eliminate any variation due to current, the boats were tested with and against the current at each rpm level and the measurements were then averaged. Additionally, the Gori propellers have an "overdrive" capa-

bility that the editors wanted to test.

As the table shows, the three-bladed fixed propeller performed slightly better in the straight-ahead speed trials. At 1,800 rpm, with the props turning at 773/758 rpm through the reduction gears in the transmissions, the fixed prop achieved 5.9 knots while the folding prop delivered 5.7 knots.

As rpm increased, the slight speed difference continued to favor the fixed propeller so that at maximum revs (3,160 for the fixed prop and 3,167 for the folding prop) the fixed prop delivered 8.2 knots while

the folding prop max'd out at 7.9 knots—a 0.3-knot difference.

OVERDRIVE

The unique feature of the Gori folding props is the way the prop can be run in "overdrive" mode. This is accomplished by opening the folding prop in the reverse configuration and then easing the transmission into forward. The prop is now presenting its straight trailing edge as its leading edge so it develops a lot more torque than it does in the normal forward running configuration.

As the measured data shows, the





SAILING TRIALS

Once the motoring tests had been completed, the editors switched off the engines and took the two Jeanneaus for side-by-side trials under sail. It was no contest. The folding prop in the folded position creates almost no drag while the three-bladed prop creates enough drag to slow down the Jeanneau by about half a knot. In 30 minutes, the fixed-prop boat had fallen behind by about a quarter of a mile.

folding prop in the overdrive mode delivers almost a full knot more boat speed than the folding prop in the forward position and up to 0.7 knot more than the fixed three-bladed prop.

The benefits of the overdrive capability are most apparent when you are motoring long distances in calm

weather and want to conserve fuel or when you are motorsailing and need an extra boost to maintain a reasonable speed. By delivering higher speeds at lower revs, the overdrive function will save fuel by about 20 percent and extend your motoring range by approximately 20 percent.

CONCLUSION

The prop tests performed by the European editors Michael Wood and Elias Johansson offer up some interesting data and some useful conclusions. First and foremost, the sail trials proved that a folding prop will


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enhance a sailboat's performance to a significant degree. Half a knot does not seem like a lot but that adds up to half a mile an hour or 12 miles a day. So, for example, for two identical boats making a 10-day run from the East Coast to the Caribbean the boat with the folding prop will arrive in the Virgin Islands a full day ahead of the boat with the fixed prop.

Under power, the fixed prop was more powerful in forward and would be better suited to punching into head seas. The folding Gori, because of its configuration, stopped the boat better and drove it better in reverse.

Gori is the only folding prop with overdrive so this capability is not the same for all folding props. But, in overdrive, the Gori was able to reduce fuel consumption and enhance



cruising range by 20 percent, which is no small advantage when fuel prices are climbing. ≈

Editor's note: This report was compiled from notes offered by the testing editors and those who joined them on the Jeanneaus in Stockholm. While

the data presented is as impartial as such data can be, there was no attempt by the testers to compare different types of folding props. The test was developed simply to demonstrate the qualities of fixed versus folding props and to measure the actual performance of the Gori overdrive capability.

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