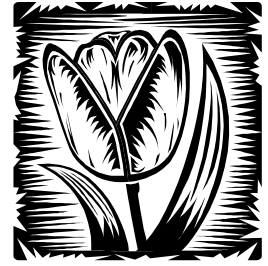


# Flicka Friends



Spring 2001

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## Flicka Performance Under Sail

By Rod Bruckdorfer  
Reviewed by Charlie Dewell

When people ask, "How well does a Flicka sail?", there are two common replies. "A Flicka can sail faster than 6 knots" and "They can not sail out of their own way." Both answers are correct, depending on the wind speed and sea conditions. A better answer is; "The Flicka can easily sail at 4 to 5 knots and on a reach she sometimes exceeds 6 knots, but in light air a drifter is a plus."

The key to sailing a Flicka is to understand that her stability is derived from her ballast. She has a wineglass shaped cross-section and as the wind speed increases the Flicka wants to heel. As the boat heels, weather helm is induced and the sail plan's center of effort must be moved forward in relation-ship to the center of lateral resistance to balance the boat. Once these concepts are mastered, the Flicka is one beautiful sailing machine for her diminutive size.

Under sail, the boat is initially tender because of her wineglass sections. Going to weather in light air she heels to about 10 degrees. As wind speed increases, she will assume 15 degrees of heel and in dirty conditions the angle of heel is between 15 and 20 degrees, depending on wind strength and the amount of canvas one is comfortable flying.

The key to working a Flicka to weather in winds equal to or greater than 20 knots is to set enough canvas aloft so she heels to 20 degrees. As she heels,



**1983 Pacific Seacraft Flicka s/v KIRI, Hull #241  
Home Port; Shilshole Bay Marina, Seattle, Washington**

the moment of the sail plan's center of effort is moved outside the boat. When this occurs, the Flicka develops weather helm quickly. The solution is to tuck a reef in the main to balance the helm - two fingers on the tiller.

The one exception to this rule is when a 135% genoa is flown. The genoa moves the center of effort aft and induces weather helm as the boat heels. The solution is to reduce the headsail area by changing sails or using the roller furling gear.

In 15 to 20 knots of wind, speed to weather is 4 to 5 knots, depending on sea

conditions. In 30 knots of wind or higher she will work to weather at 3½ to 4 knots. The tack-to-tack angle is between 110 and 120 degrees. Tacking the boat can sometimes be a challenge. Because of her full keel and forefoot, she comes across the wind similar to any boat with a full keel.

Compared to a fin keel boat or a boat with a cut-away forefoot, she tacks slowly. In most conditions, when the seas are moderate, the Flicka tacks easily and on command. When the seas become "dirty" and a 3 to 4 foot chop is running, tacking can sometimes be a challenge.

*(Continued on page 3)*

**Flicka Sail Selection Issue**

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# From the Editor

**.By Tom Davison**

This issue represents research into fourteen different sail combinations for the Flicka. The goal was to show how the various sails relate to one another, to the Flicka and for various displacements of the Flicka.

It **IS NOT** my suggestion that all of the sails be purchased or carried aboard your Flicka. This would certainly break the bank for most owners and reduce the cabin to something similar to the "sewer"

of an American's Cup yacht. My original goal was to publish this issue with approximately 30 photos of each sail combination and under the corresponding wind force. That was not to be and the decision was made to present the just the information.

Please forgive the text book presentation. I would like to post this issue as a series of web pages. If you would like to submit a photo of your Flicka under sail, it will aid me with completion of this internet project on the Flicka Home Page. Thanks!

# The Missing Jib

**By Tom Davison**

Hunter Davis noticed a real gap in Flicka sail coverage during his trip up the Inside passage north from Seattle, Washington to Ketchikan, Alaska. Looking over the tables in this issue confirms his observation. There is a real gap between the Storm Trys'l / Storm Jib combination and the next sail selection. You jump from 66 square feet to 148 square feet. This is an

increase of more than 100%. He also included a solution to the problem. Use the cutter stay sail in place of the jib. At 60 square feet with a reef available, this fits works perfectly in between the other two sails. The Storm Trys'l / Cutter Jib ends up at 96 square feet. This put the combination squarely between the 66 square feet of the Trys'l/Storm Jib and the 148 square feet of the double reefed main and reefed 100%.

# Disclaimer

**By Tom Davison**

Since Flickas have many different displacements; sail plans; total sail area; sail selection; sail condition; captain/crew knowledge, skills, ability & experience; and many other factors (including wind speed, sea condition, fetch, and others), the responsibility for the safe use of these tables falls upon the captain and crew of each Flicka. Given all of the variables listed (or not listed), the information contained in this issue of Flicka Friends must be viewed as a starting point. You must determine just how close this information is to your particular Flicka, its sails, and to your experience and skill.

The bottom line it that I have always thought that travel away from developed areas, safety is the responsibility of each member of the party. Not only they must be able to accurately judge their equipment, individual & group skills, they must compare their capabilities against the existing sea and weather condtions. The burden to continue with, postpone or even cancel a trip falls on the shoulders of the captain and each person in the party. Using these tables carefully and with all due care and caution. Now the warnings are out of the way...

**Have fun & Fair winds  
and good sailing...**

# Flicka Sail Performance

*(Continued from page 1)*

Because of her short ends and blunt bow, the boat wants to pitch as the bow is turned into the wind. The pitching motion causes her to lose speed and tacking may become difficult.

The key in these conditions is to time the tack in relationship to the chop and do not let the headsail flog, which will contribute to slowing the boat. It may be necessary to let the headsail back as she comes across the eye of the wind. This will push the bow off the wind.

Once the tack is complete, as with most full keel boats, she will fall off the wind and come back on tack as boat speed increases. In very trying conditions, it may be necessary to wear round the boat, i.e. to turn the head of the boat away from the wind and gybe her to bring her onto the opposite tack.

Reaching in a Flicka is sheer joy. From a close reach to a broad reach she is in her element. Under these conditions, she heels between 10 and 15 degrees, depending on wind strength and is a happy "little ship." In 15 knots of wind she will reach at 5 knots or better and in 20 knots of wind, the boat will approach 6 knots and sometimes exceed 6 knots as the boat comes more and more off the wind.

As with windward work, the Flicka will start to develop weather helm. Tucking a reef in the main balances the boat by moving the sails' center of effort forward. A second step which may be taken to reduce weather helm is to flatten the main.

Attaching a vang/pre-venter from the boom to the boat's toe rail. In addition to helping decrease weatherhelm, sail chafe on the shrouds is also decreased. A well balanced Flicka under these conditions can be steered with two fingers on the tiller. The Flicka has two sailing weaknesses. One is in wind speeds of 10

knots or less. Under these conditions, a drifter should be flown. With a drifter, boat speed may exceed 4 knots in 10 knots of wind. In 5 knots of wind, the Flicka will sail at 2 to 2½ knots with a well set drifter and the main vang'd to the toerail with a preventer. This stops the boom moving in the seaway, which causes the main to lose lift.

The second weakness is her short ends and blunt bow. In a steep chop, the boat will sometimes hobbyhorse. This may result from pinching the boat too high into the wind or not carrying enough canvas to drive the boat hard. Footing to weather instead of beating and driving the boat hard will correct this deficiency under most conditions.

How well does a Flicka sail? For her size and displacement she is an exceptionally fine sailing machine. She is not only fast for her size, she is seaworthy, has a kind motion and a reputation for keeping her crew safe.

In a personal conversation with Bruce Bingham, her designer, I remarked,

*"I don't know what you did when you designed the boat, but you created an extremely fast, seaworthy boat."*

*Mr. Bingham replied, "I did nothing -- I just transferred the lines of the two boats I discovered near Wickford, Rhode Island."*

In retrospect, what Bruce Bingham did was to not only give us a fine sailing machine which has stood the test of time, but he preserved a hull form that is part of America's maritime history. When you sail a Flicka, you are sailing a boat whose lineage can be traced to 1840.

**Thanks to Rod Bruckdorfer for allowing a reprint of his article.**

# About Flicka Friends

**Flicka Friends** is a newsletter written specifically for the people who own, crew aboard, or are interested in the Flicka, a Bruce P. Bingham design. Based on the Newport boats of Block Island Sound, this little ship has been built from various materials since the 1970's until the present day.

Hulls have been completed by home builders using plans supplied by Bruce Bingham. More than 400 plans were sold and many Flickas can be found in New Zealand, Australia and Sweden. Commercial builders of the Flicka include Nor\*Star, Westerly Marine and Pacific Seacraft Corporation. Pacific Seacraft (Fullerton, California) has built nearly 450 hulls.

**Flicka Friends** is published quarterly. Articles, photographs and letters are welcome and encouraged. Originally a printed newsletter, this document was converted to an "e-newsletter" and sent out via the internet. This offered several advantages.

Most importantly, the newsletter is in full color, a considerable improvement over the black & white photocopies formerly sent out. With the reduced cost, the subscription fees were eliminated. Now, the only cost is the monthly subscription (after the computer, scanner, software and internet service) is my time.

If you would like to be added to the mailing list, please send an e-mail to editor at: [flickafriends@nmo.net](mailto:flickafriends@nmo.net)

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# The Weather Legacy of

By Keith C. Heidorn, PhD, ACM

Admiral Robert Fitzroy of H.M.S. Beagle fame wrote of Admiral Sir Francis Beaufort, "All honor to Beaufort, who used and introduced this succinct method of approximation by scale..."

The method to which Fitzroy refers, one of Beaufort's many accomplishments during his distinguished naval career, is the Wind Force Scale, still in widespread use today by men of the sea.

Francis Beaufort was born in 1774, in County Meath, Ireland, the son of the Reverend Daniel Augustus Beaufort, the Rector of Navan. At the tender age of 13, he began his nautical career as a cabin boy in the British Navy.

Three years after going to sea, Francis Beaufort recognized the value of being weatherwise and began keeping a meteorological journal in the form of brief comments on the general weather scene, a practice he would continue until his death. And at 22, he had risen to the rank of lieutenant, serving aboard H.M.S. Phaeton.

In 1805, Beaufort was given his first command, H.M.S. Woolwich, and assigned to conduct a hydrographic survey of the Rio de la Plata region of South America. During these early years of command, he developed the first versions of his Wind Force Scale and Weather Notation coding, which he was to use in his journals for the remainder of his life.

## Injury Leads to New Career

Beaufort's assignment during the years 1811 and 1812 led him to the Eastern Mediterranean off Asia Minor for a combined hydrographic study and patrol mission against the pirates operating out of the Levant. In June, 1812, Beaufort sent a survey party ashore to make astronomical observations. When the party encountered armed hostilities from the local pashas, Beaufort himself led the rescue. As they were rowing back to H.M.

BEAUFORT WIND FORCE SCALE		
BEAU-FORT SCALE	WIND SPEED IN KNOTS	WIND DESCRIPTION
0	0	Calm
1	1-3	Light Air
2	4-6	Light Breeze
3	7-10	Gentle Breeze
4	11-16	Moderate Breeze
5	17-21	Fresh Breeze
6	22-27	Strong Breeze
7	28-33	Moderate Gale
8	34-40	Fresh Gale
9	41-47	Strong Gale
10	48-55	Storm
11	56-65	Storm
12	65+	Hurricane

S. Fredrikssteen, Beaufort was struck in the groin by sniper fire. The ball fractured Beaufort's hip, and he subsequently spent several months convalescing aboard ship.

By the end of the year, however, it was obvious that both ship and commander were in great need of repair, and they were ordered home by the Admiralty. Francis Beaufort would never again return to active sea duty although he would remain in the British Navy until he was 81.

In 1829, Beaufort was appointed Hydrographer to the Admiralty. From this post, he outlined the hydrographic studies for many British expeditions including that of H.M.S. Beagle, commanded by his protégé Robert Fitzroy.

In 1838, Beaufort's Wind Force Scale was introduced for use by the British fleet

for all log entries, joining his Weather Notation, which had been prescribed for use five years earlier.

The Admiralty promoted Beaufort to Rear Admiral in 1846. Beaufort was bestowed the title Knight Commander of the Bath two years later. In 1855, after 68 years of service, Sir Francis retired from the Admiralty. He died in 1857, but his life's work continued to receive recognition and honor.

Of his many achievements, Admiral Beaufort is remembered today most for the Wind Force Scale which now bears his name. The scale, which he conceived in 1805 and the British Navy adopted in 1838, however, underwent major changes in the 100 years following its initial adaptation. In his journal for January of 1806, then-Commander Beaufort wrote, "From now on I shall evaluate the force of

# Admiral Sir Francis Beaufort

the wind in accordance with the following scale, since nothing gives a more indefinite representation of the wind and the weather than the previously used expressions like moderate wind or cloudy weather."

Originally, the Wind Force Scale consisted of 13 degrees of wind strength, from calm to hurricane, and was based upon the effects of various wind strengths upon the amount of canvas carried by the fully rigged frigates of the period.

In the days before elaborate meteorological instruments, Beaufort had chosen for his wind sensor the prime ship of the British fleet. The 1831 version of the wind scale as outlined in a memorandum to Commander Robert Fitzroy could be divided into three sections.

The first five states (Forces 0-4) described a ship's speed with all sails set and clean full, and in smooth water.

The next five (Forces 5-9) concerned the ship's mission, the chase, and its sail-carrying ability. For example, in a fresh gale (Force 8), a well-conditioned man-of-war could just carry in chase, full and by, treble-reefed topsails, etc.

The final three Forces (10-12) referred to a ship's ability to survive whole gale, storm, or hurricane.

In 1838, the British Admiralty officially prescribed the Scale and made its use mandatory for all ship's log entries, for, as it was defined, the Scale had no ambiguities for the sailors and officers of the day.

But the winds of change move ever onward, and like Beaufort himself, the frigate eventually passed from the scene as the prime ship of the British Navy. Thus, when the Permanent Committee of the First Meteorological Congress met to adopt the Beaufort Wind Scale for

international use in meteorological telegrams, changes were needed.

## Refinement of the Beaufort Wind Scale

Since the frigate was no longer the dominant ship on the seas, a new "probe" was necessary to determine the wind's force.

The original Beaufort force numbers were now subtly changed so that they referred to states of the sea or degrees of motion of trees instead of the sails on a frigate. But ambiguities soon arose, for the state of the sea also depends upon swell, fetch and water depth, and trees vary in their response to the wind.

Finally, in 1946, the International Meteorological Committee, extending the scale to 17 values (the added five values further refining the hurricane-force winds), defined the scale values by ranges of the wind speed as measured at a height of 10 meters above the surface for each Force Number.

In effect, this transformed the Beaufort Wind Force Scale into the Beaufort Wind Speed Scale.

## The Beaufort Weather Notation Code

As Francis Beaufort rose in rank, his weather journal entries became a regular part of his daily routine, ultimately increasing in frequency to observations at two-hour intervals.

To describe the state of wind and weather accurately but briefly, Beaufort devised a system of notation that was to become the forerunner for modern weather-observation codes.

One part of this observation notation was the wind force number from his Wind Force Scale. The second part of the code was a series of alphabetic symbols of one to three characters which described the state of the sky and weather, differentiating between types of precipitation

and cloud conditions. Between 1806 and 1832, Beaufort further refined his original coding scheme. For example, in the 1806 designation, Beaufort used f to indicate fine weather.

In the 1826 version, this notation now represented fog. With slight alterations, the Beaufort Weather Notation was adopted by the British Navy in 1833.

Nearly a century later, the British Meteorological Office adopted the code for use, again with only slight alterations such as adding intensity indicators (e.g., the use of the upper rather than the lower case to indicate high-intensity precipitation).

An international conference meeting in Warsaw, Poland in 1935 officially approved a form of the Beaufort notation for international exchange of weather observations. [Table of Beaufort's Weather Notation adopted by these agencies.]

Today, numbers have generally replaced alphabets for the reporting of general meteorological observations, except for some specialized reports where letter notation is still used to indicate weather and cloud conditions.

And direct measurements have replaced the estimates of the Wind Force Scale. The new forms, however, do not hide the legacy of Sir Francis Beaufort as landmen and sailors alike continue to describe the ever-changing sea and the ever-present wind.

**My thanks to  
Keith C. Heidorn, PhD, ACM  
and the Weather Doctor  
for allowing Flicka Friends  
to reprint this article.**

(<http://www.islandnet.com/~see/weather/doctor.htm>)

# The Beaufort Scale

By Tom Davison

Several years ago, I decided to take a look at the Flicka's sail inventory. A number of articles and books covering sails and their selection were reviewed. While there were many sources of information, one of the best publications was *The Best of Sail Trim*, edited by Charles Mason. This is a collection of articles relating to sail use which have appeared in *SAIL Magazine*. Several articles seemed to provide a means to answering the question about selecting sails;

- **When to Shorten Down**  
Calculating sail-carrying ability  
Gabriel M. Giannini
- **Wind Strength and Sail Area**  
How to determine optimum combinations.  
Arthur Edmunds
- **Which Headsail When?**-Systemized sail changing  
Richard du Moulin

After reading these articles, I decided to examine the sail area and sail combinations for the Flicka at given wind speeds. Based on the Beaufort Scale, a number of reference tables were created. They helped me develop an overall picture of how sail area effects a Flicka.

Looking at these tables and figures, please remember that they are based on math and you must connect these numbers with real sailing. While there are racers who put up spinnakers for a downwind leg in winds that would make most of us a weak in the knees, my sailing is a much more reasonable.

Researching the various sails for the Flicka took less time than expected. There were advantages and disadvantages for each sail size, design, fabric weight and sail loft. The basic sail plan for the Flicka is:

Flicka Sail Specifications		
Total Sail Area		250 sq. ft.
Working Jib		
I = 29.3'	J = 10.5'	133 sq. ft.
Main Sail		
P = 23.33'	E = 8.88'	113 sq. ft.

Flicka Sail Selection	
Main	113 sq. ft.
Cruising Spinnaker	398 sq. ft.
150% Drifter	259 sq. ft.
140% Drifter	199 sq. ft.
140% Genoa	199 sq. ft.
130% Genoa	172 sq. Ft.
120% Genoa	159 sq. ft.
110% Working Jib	133 sq. ft.
80% Working Jib	106 sq. ft.
Storm Jib	66 sq. ft.
Storm Trys'l	36 sq. ft.

## SAIL SELECTION TABLES

Now that all of the sails have been described, I turn your attention to the tables in this issue of Flicka Friends. At times, you may wish for just a mainsail, a working jib, two halyards, and the three necessary sheets. That would certainly simplify my sailing, but I would also travel slower.

I'm sure that many of you would feel that all of this information gets in the way of sailing. Maybe so, but this research does provide relative information about the performance of a Flicka and should flatten your learning curve. The tables allow you to consider various sail changes in certain wind conditions.

The other advantage of these tables is that they show an overlap for several sails. These redundant sails might be eliminated from your sail inventory, freeing up space onboard and simplifying my already complicated sail system.

The tables include:

- **BEAUFORT SCALE**  
This table shows the system that was developed by Sir Francis Beaufort in the late 1800's.
- **SAIL COMBINATION & BALANCE**  
This chart shows the various sail combinations that are possible using the ten different sails aboard my Flicka. Keep in mind that this table shows the combined area and sail balance for all of the sails for the Flicka. The number represents a simple computation based on the percentage of

# And The Flicka

the total sail area that each sail provides. Obviously, some of the combinations are not practical in actual sailing conditions. I'm sure that flying a spinnaker with a storm trys'l would certainly make people wonder what you were thinking.

- **SAIL AREA & FORCE**

After looking at the various sail combinations, the force generated at each Beaufort Force was computed. While the math was done for all the combinations in each Beaufort Force, it should be very clear to all that many of these sail combinations produce **too much force for sailing a Flicka safely**. They are presented merely as an example of the extreme forces sails can generate. Flying a full main and a spinnaker in anything other than the lowest Forces is foolhardy at best. If your Flicka wasn't instantly knocked down, the light sails would blow out at the higher wind force levels.

- **SAIL AREA vs. DISPLACEMENT**

Since the displacement of Flickas is not constant, the sail combinations mentioned in this article provide varying ratios. This table provides the sail area to displacement ratio for Flicka displacements ranging from 4,500 pounds to 6,500 pounds.

- **SAIL CARRYING ABILITY**

With all of the information provided in the various charts, this last chart should begin to make sense of the math. This table does not separate the sail recommendations based on the varying displacement.

There are two reasons for not creating such a table. First, it would require another four pages and this issue is already a little long. Second, it leave the final selection of sails to the captain. Sailing a Flicka is more than a series of mathematical calculations and even with eight pages of tables, the decision to fly what ever sail combination remains with the captain.

## THE CUTTER RIG

The cutter-rigged Flicka has an advantage over the sloop rig. The stays'l is 60 square feet and with a double reefed main of 58 square feet, brings the total sail area to 118 square feet. This fits nicely between the double reefed working jib/double reefed main and the storm jib and storm trys'l. The combination is also evenly balanced fore and aft.

Using the stays'l moves the headsail away from the bow as well. The cutter rig is the best choice. Since using the stays'l is always an option, it allows even more sail combinations. That data will wait for another issue of Flicka Friends.

## FINAL COMMENTS

Please keep in mind that the data in these tables represents the math behind using various sail combinations on a Flicka. As such, you will need to try each sail combination to see just how it works aboard your particular Flicka. Remember that the varying displacement of the Flicka over the years combined with the variable weight of the equipment aboard will figure into your sail selection. Your sailing style and experience also play an important role in the sails combination selected for a given condition.

You may or may not agree with the figures and the sail recommendations. Any thoughts or comments relating to this article would be welcomed. If nothing else, this article will open up the a lively discussion about sail use aboard the Flicka. The best Flicka forum on the internet can be found at:

<http://groups.yahoo.com/group/Flicka20>

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See descriptions on this page for more detail.	

- **HEALING ANGLE & SAIL AREA**

The effective sail area decreases as a sailboat heals over before the wind. At higher angles of heal, it makes more sense to reduce sail to travel at a shallower angle of heal. This table gives you relative sail areas based on various healing angles for each sail combination.

# Flicka Displacement

By Tom Davison

The displacement of your Flicka will have an effect on the amount of sail you carry. This is just simple physics. The more something weighs, the more effort it will take to move it.

Looking at the displacements on the Pacific Seacraft sales brochures, an empty Flicka's displacement can be anywhere from 4,500 to 6,000 pounds. Home built Flickas could be much lighter, if the hull is built lighter and the keel weight is reduced. I know of one Flicka with only 1,500 pounds of ballast.

Flicka Displacement	
1972 - Bingham	10,000 pounds
1972 - Nor'Star	4,500 pounds
1978 - Pacific Seacraft	4,500 pounds
1980 - Pacific Seacraft	5,000 pounds
1985 - Pacific Seacraft	5,500 pounds
1996 - Pacific Seacraft	6,000 pounds

Obviously, a Flicka loaded down for an ocean crossing will perform differently than one that is out for an afternoon sail. The heavier your boat, the more sail you will need to carry to obtain the same performance of a lighter Flicka.

The Flicka's displacement has changed over the year from Bruce Bingham's original plans. The first listing is from an article in the March 1972 issue of Rudder Magazine. Most of the specifications are similar to Flickas produced by Nor'Star and Pacific Seacraft except three; a displacement of 10,000 pounds, 3,800 pounds of ballast and a sail area of 270 square feet.

The next information I have is the six part series about building a ferro-cement Flicka. The displacement dropped nearly 50% to 5,500 pounds, with 1,720 pounds of ballast and a sail area of 270 square feet.

Pacific Skipper published an article about the Nor'Star Flicka currently owned by Flicka Home Page WebCaptain Rod Bruckdorfer. Specifications were nearly the same except there is three more inches of draft, displacement is 6,500 pounds, ballast is 2,200 pounds, and sail area was up to 400 square feet.

The first article for a Pacific Seacraft Flicka showed a displacement of 4,500 pounds and 1,750 pounds of ballast with 250 square feet of sail.

Practical Sailor's February 1982 article had the Flicka's length over all at 23' 7", a displacement of 5,500 pounds, ballast at 1,750 pounds and 250 square feet of sail.

An article in SEA's September 1987 issue placed most of the numbers in the same area as before, except the ballast was now 1,800 pounds.

The change in displacement has changed some of the design mathematics. One interesting aspect of the higher displacement is that the motion comfort and capsize ratio improved.

Displacement / Ballast Ratio		
Displacement	Ballast	Ratio
4,500 pounds	1,800	2.50
5,000 pounds	1,800	2.77
5,500 pounds	1,800	3.05
6,000 pounds	1,800	3.33
6,500 pounds *	1,800	3.61
7,000 pounds *	1,800	3.88
7,500 pounds *	1,800	4.16
8,000 pounds *	1,800	4.44
* Flicka with crew & cruising gear		

The displacement change from 4,500 pounds in 1976 to 6,000 pounds in 1990 represents an increase of approximately 33%. Since the sail plan remained the same, the additional weight reduced the effective performance by nearly 22%, something to consider when ordering sails.

Note
<p>The upper displacement is based on a comment made by Jack Harding about s/v <i>RAPPORT</i> before his passage from San Diego, California to Hilo, Hawaii.</p> <p>While being lifted from a semi-trailer, the travel lift registered a gross weight of 8,000 pounds.</p>



# Flicka Displacement

Sail Area vs. Displacement Ratio	
Displacement	Ratio
4,500	14.44
5,000	13.46
5,500	12.63
6,000	11.92
6,500 *	11.30
7,000 *	10.62
7,500 *	10.15
8,000 *	9.72
* Flicka with crew & cruising gear	

The lower the capsize ratio, the better the rating. Anything under a 2.0 is considered good. The improvement of the capsize ratio made me wonder about the formula and if the better number was based on the assumption that the additional weight is ballast and not stores. I would suspect that the increase in the displacement during a passage is not an improvement due to the location of the additional weight. Since I'm not a naval architect, these calculations are beyond my skills and the mathematical level of this article.

Displacement / Length Waterline	
Displacement	Ratio
4,500	331
5,000	368
5,500	405
6,000	441
6,500 *	478
7,000 *	527
7,500 *	565
8,000 *	602
* Flicka with crew & cruising gear	

The increased displacement of the Flicka might have a positive outcome on the motion of the sailboat. Considering the weight is not additional ballast, this formula may not be valid.

Motion Comfort	
Displacement	Ratio
4,500	21.68
5,000	24.09
5,500	26.50
6,000	28.91
6,500 *	31.32
7,000 *	33.90
7,500 *	36.32
8,000 *	38.74
* Flicka with crew & cruising gear	

Capsize Ratio	
Displacement	Ratio
4,500	1.94
5,000	1.87
5,500	1.81
6,000	1.76
6,500 *	1.71
7,000 *	1.65
7,500 *	1.64
8,000 *	1.60
* Flicka with crew & cruising gear	

The bottom line for all of this math is that Flickas with various displacements will perform differently. The heavier the Flicka the slower it will go with a given set of sails. This statement is so basic, I almost didn't put it in print. The goal of this Flicka Friends issue was to provide the math to quantify the reason for varying performance and to help Flicka owners make something more than just a guess at sail selection while out sailing and when looking for new sails.

# The Beaufort Scale and

<b>FORCE and WIND SPEED And P.S.F.</b>	<b>Full Main 113 Sq. Ft. Spinnaker 398 Sq. Ft. 511 Sq. Ft.</b>	<b>Full Main 113 Sq. Ft. Gennaker 259 Sq. Ft. 372 Sq. Ft.</b>	<b>Full Main 113 Sq. Ft. 150% Genoa 220 Sq. Ft. 333 Sq. Ft.</b>	<b>Full Main 113 Sq. Ft. 140% Genoa 199 Sq. Ft. 312 Sq. Ft.</b>	<b>Full Main 113 Sq. Ft. 130% Genoa 172 Sq. Ft. 285 Sq. Ft.</b>	<b>Full Main 113 Sq. Ft. 120% Genoa 159 Sq. Ft. 272 Sq. Ft.</b>	<b>Full Main 113 Sq. Ft. 110% Jib 133 Sq. Ft. 246 Sq. Ft.</b>
<b>One 1-3</b>	15.33	11.16	9.99	9.36	8.55	7.86	7.38
<b>Two 4-6</b>	45.99	33.48	29.97	28.08	25.65	23.58	22.14
<b>Three 7-10</b>	153.00	111.60	99.90	93.60	85.50	78.60	73.80
<b>Four 11-16</b>	357.70	260.40	233.10	218.40	199.50	183.40	172.20
<b>Five 17-21</b>	766.50*	558.00*	499.50	468.00	427.50	393.00	369.00
<b>Six 22-27</b>	1,277.50*	930.00*	832.50*	780.00*	712.50*	655.00*	615.00*
<b>Seven 28-33</b>	1,839.60*	1,339.20*	1,198.80*	1,123.20*	1,026.00*	943.20*	885.60*
<b>Eight 34-40</b>	2,861.60*	2,083.2*	1,864.80*	1,747.20*	1,596.00*	1,467.20*	1,377.60*
<b>Nine 41-47</b>	4,088.00*	2,976.00*	2,664.00	2,496.00*	2,280.00*	2,096.00*	1,968.00*
<b>Ten 48-55</b>	5,927.60*	4,240.80*	3,796.20*	3,556.80*	3,249.00*	2,986.80*	2,804.40*
<b>Eleven 56-65</b>	7,665.00*	5,580.00*	4,995.00*	4,680.00*	4,275.00*	3,930.00*	3,690.00*
<b>Twelve 65+</b>	8,687.00+*	6,324.0+*	5,661.00*	5,304.00+*	4,845.00+*	4,454.00+*	4,182.00+*

**\* NOTE:**

It should be noted that the sail combinations shown above include a number of combinations that should not be used. The information has been included for illustration purposes and IS NOT a recommendation for use. Read the disclaimer on Page Two for more information.

# Flicka Sail Selection

<b>FORCE and WIEND SPED and P.S.F.</b>	<b>Full Main 113 Sq. Ft. 80% Jib 106 Sq. Ft.  226 Sq. Ft.</b>	<b>Full Main 113 Sq. Ft. 100% Jib/1 Rf 90 Sq. Ft.  203 Sq. Ft.</b>	<b>Main - 1 Reef 78 Sq. Ft. 80% Jib 106 Sq. Ft.  184 Sq. Ft.</b>	<b>Main - 1 Reef 78 Sq. Ft. 100% Jib/Reef 90 Sq. Ft.  168 Sq. Ft.</b>	<b>Main - 2 Reefs 58 Sq. Ft. 80% Jig 106 Sq. Ft.  164 Sq. Ft.</b>	<b>Main -2 Reefs 58 Sq. Ft. 100% Jib/Reef 90 Sq. Ft.  148 Sq. Ft.</b>	<b>Storm Trys'l 36 Sq. Ft. Storm Jib 30 Sq. Ft.  66 Sq. Ft.</b>
One 1-3 0.03	6.78	6.57	5.52	5.04	4.92	2.68	1.98
Two 4-6 0.09	20.34	19.71	16.65	151.20	14.76	7.92	5.94
Three 7-10 0.30	67.80	64.80	55.20	50.40	49.20	26.40	19.80
Four 11-16 0.70	158.20	153.30	128.80	117.60	114.80	61.60	46.20
Five 17-21 1.50	339.00	328.50	276.00	252.00	246.00	132.00	88.00
Six 22-27 2.50	565.00	547.50*	460.00	420.00	420.00	220.00	165.00
Seven 28-33 3.60	813.60	788.40*	662.40	604.80	590.40	316.80	237.60
Eight 34-40 5.60	1,265.60	1,226.40*	1,030.40	940.80	918.40	492.80	369.60
Nine 41-47 8.00	1,808.00	1,752.00*	1,472.00	1,344.00	1,312.00	704.00	528.00*
Ten 48-55 11.4	2,576.40	2,496.60*	2,097.60	1,915.20	1,869.60	1,003.20	752.40*
Eleven 56-65 15.0	3,390.00	3,285.00*	2,760.00	2,520.00	2,460.00	1,320.00	990.00*
Twelve 65+ 17.0+	3,842.00	3,723.00+*	3,128.00	2,856.00	2,788.00	1,496.00+*	1,122.00+*

## \* NOTE:

It should be noted that the sail combinations shown above include a number of combinations that should not be used. The information has been included for illustration purposes and IS NOT a recommendation for use. Read the disclaimer on Page Two for more information.

# The Beaufort Scale

## Flicka Sail Area and Sail Balance

MAIN SAILS TO THE RIGHT	Full Main 113 Sq. Ft.	Main Single Reef 78 Sq. Ft.	Main Double Reef 58 Sq. Ft.	Storm Trys'l 36 Sq. Ft
HEADSAILS BELOW	Sail Area % Forward / % Aft	Sail Area % Forward / % Aft	Sail Area % Forward / % Aft	Sail Area % Forward / % Aft
Spinnaker 398 Sq. Ft.	511 Sq. Ft. 77% / 22%	476 Sq. Ft. 84% / 16%	456 Sq. Ft. 88% / 12%	434 Sq. Ft. 92% / 8%
Gennaker 259 Sq. Ft.	372 Sq. Ft. 70% / 30%	337 Sq. Ft. 77% / 33%	317 Sq. Ft. 82% / 28%	295 Sq. Ft. 88% / 12%
150% Drifter 220 Sq. Ft.	333 Sq. Ft. 66% / 34%	298 Sq. Ft. 74% / 26%	278 Sq. Ft. 79% / 21%	256 Sq. Ft. 86% / 14%
140% Genoa 199 Sq. Ft.	312 Sq. Ft. 64% / 36%	277 Sq. Ft. 72% / 28%	257 Sq. Ft. 77% / 23%	235 Sq. Ft. 85% / 15%
130% Genoa 172 Sq. Ft.	285 Sq. Ft. 60% / 40%	250 Sq. Ft. 69% / 31%	230 Sq. Ft. 75% / 25%	208 Sq. Ft. 83% / 17%
120% Genoa 159 Sq. Ft.	272 Sq. Ft. 58% / 42%	237 Sq. Ft. 67% / 33%	217 Sq. Ft. 73% / 27%	195 Sq. Ft. 82% / 18%
100% Jib 133 Sq. Ft.	246 Sq. Ft. 54% / 46%	211 Sq. Ft. 63% / 37%	191 Sq. Ft. 70% / 30%	169 Sq. Ft. 79% / 21%
80 % Jib 106 Sq. Ft.	219 Sq. Ft. 48% / 52%	184 Sq. Ft. 58% / 42%	164 Sq. Ft. 65% / 35%	142 Sq. Ft. 75% / 25%
100% Jib - 1 Reef 90 Sq. Ft.	203 Sq. Ft. 44% / 56%	168 Sq. Ft. 54% / 46%	148 Sq. Ft. 61% / 39%	126 Sq. Ft. 71% / 29%
Storm Jib 30 Sq. Ft.	143 Sq. Ft. 21% / 80%	108 Sq. Ft. 28% / 72%	88 Sq. Ft. 34% / 66%	66 Sq. Ft. 45% / 55%

### NOTE:

It should be noted that the sail combinations shown above include a number of combinations that should not be used. The information has been included for illustration purposes and IS NOT a recommendation for use. Read the disclaimer on Page Two for more information.

# and the Flicka

## Sail Area vs. Displacement

MAIN SAILS TO THE RIGHT	Total sail area and performance increase/decrease from 100% (Full Main and 100% Jib) Sail Area/Displacement at Various Displacements of the Flicka 4,500 pounds / 5,000 pounds 5,500 pounds / 6,000 pounds / 6,500 pounds				
	HEADSAILS BELOW	Full Main 113 Sq. Ft.	Main Single Reef 78 Sq. Ft.	Main Double Reef 58 Sq. Ft.	Storm Trys'l 36 Sq. Ft.
Spinnaker 398 Sq. Ft.		511 Sq. Ft. - 201% 29.00 / 27.96 26.24 / 24.76 / 23.47	476 Sq. Ft. / 193% 27.94 / 26.04 24.44 / 23.06 / 21.86	456 Sq. Ft. - 185% 26.76 / 24.95 23.41 / 22.09 / 20.94	434 Sq. Ft. - 178% 25.47 / 23.74 22.28 / 21.01 / 19.93
Gennaker 259 Sq. Ft.		372 Sq. Ft. - 151% 21.83 / 20.35 19.10 / 18.02 / 17.09	337 Sq. Ft. - 137% 19.78 / 18.44 17.30 / 16.33 / 15.32	317 Sq. Ft. - 129% 18.61 / 17.34 16.28 / 15.36 / 14.56	295 Sq. Ft.—121% 17.31 / 16.14 15.15 / 14.29 / 13.55
150% Drifter 220 Sq. Ft.		333 Sq. Ft. - 135% 19.84 / 18.22 17.10 / 16.13 / 15.30	298 Sq. Ft. 121% 17.49 / 16.30 15.30 / 14.44 / 13.59	278 Sq. Ft. - 113% 16.32 / 15.21 14.27 / 13.47 / 12.77	256 Sq. Ft. - 104% 15.03 / 14.01 13.14 / 12.40 / 11.76
140% Genoa 199 Sq. Ft.		312 Sq. Ft. - 127% 18.31 / 17.07 16.02 / 15.12 / 14.33	277 Sq. Ft. - 113% 16.26 / 15.16 14.22 / 13.42 / 12.72	257 Sq. Ft. 15.08 / 14.06 13.20 / 12.45 / 11.80	235 Sq. Ft. - 95% 13.79 / 12.86 12.07 / 11.39 / 10.79
130% Genoa 172 Sq. Ft.		285 Sq. Ft. - 115% 15.78 / 17.54 19.30 / 21.05 / 22.80	250 Sq. Ft. 102% 14.67 / 13.68 12.84 / 12.11 / 11.48	230 Sq. Ft. - 93% 13.50 / 12.58 11.81 / 11.14 / 10.56	208 Sq. Ft. - 85% 12.21 / 11.38 10.68 / 10.08 / 9.55
120% Genoa 159 Sq. Ft.		272 Sq. Ft. - 110% 15.96 / 14.88 13.97 / 13.18 / 12.49	237 Sq. Ft. - 97% 13.91 / 12.97 12.17 / 11.48 / 10.89	217 Sq. Ft. - 89% 12.87 / 11.87 11.14 / 10.51 / 9.97	195 Sq. Ft. - 79% 11.45 / 10.67 10.01 / 9.45 / 8.96
100% Jib 133 Sq. Ft.		246 Sq. Ft. - 100% 14.44 / 13.46 12.63 / 11.92 / 11.30	211 Sq. Ft. - 86% 12.38 / 11.54 9.45 / 8.91 / 8.45	191 Sq. Ft. - 78% 11.21 / 10.45 9.81 / 9.25 / 8.77	169 Sq. Ft. - 69% 9.92 / 9.25 8.68 / 8.19 / 7.76
80 % Jib 106 Sq. Ft.		219 Sq. Ft. - 89% 12.85 / 11.98 11.24 / 10.61 / 10.06	184 Sq. Ft. - 75% 10.80 / 10.07 9.45 / 8.91 / 8.45	164 Sq. Ft. - 67% 9.63 / 8.97 8.42 / 7.95 / 7.53	142 Sq. Ft. - 57% 8.33 / 7.77 7.29 / 6.88 / 6.52
100% Jib - 1 Reef 90 Sq. Ft.		203 Sq. Ft - 82% 11.91 / 11.11 10.42 / 9.84 / 9.32	168 Sq. Ft. - 67% 9.68 / 9.19 8.63 / 8.14 / 7.72	148 Sq. Ft. - 60% 8.69 / 8.10 7.60 / 7.17 / 6.80	126 Sq. Ft. - 51% 7.40 / 6.89 6.47 / 6.10 / 5.79
Storm Jib 30 Sq. Ft.		143 Sq. Ft. 58% 8.39 / 7.82 7.34 / 6.93 / 6.57	108 Sq. Ft. - 44% 6.34 / 5.91 5.55 / 5.23 / 4.96	88 Sq. Ft. - 36% 5.16 / 4.81 4.52 / 4.26 / 4.04	66 Sq. Ft. - 27% 3.87 / 3.61 3.39 / 3.20 / 3.03

This table was created to show the relative power of a sail combination with five different displacements of the Flicka, a figure that can change up to 20%. The displacements were based on the information contained in the order forms provided by Pacific Seacraft. The percentages shown in each block is the performance compared to a full main and a 100% jib. Possibly the most important aspect of this complicated table is the documentation of how much the increased displacement alters performance. Note that the percentage is based on the performance of the sail combination and not total sail area.

# The Beaufort Scale

## The Flicka's Sail Carrying Ability

WIND FORCE WIND SPEEDSAIL AREA BELOW		Force 1 1-3 Kt	Force 2 4-6 Kt	Force 3 7-10 Kt	Force 4 11-16 Kt	Force 5 17-21 Kt	Force 6 22-27 Kt	Force 7 28-33 Kt	Force 8 34-40 Kt	Force 9 41-47 Kt	Force 10 48-55 Kt
Full Main Spinnaker Total	113 sq ft 398 sq ft 511 sq ft	YES	YES	MAYBE	NO	NO	NO	NO	NO	NO	NO
Full Main Gennaker Total	113 sq Ft 259 sq Ft 372 sq Ft	YES	YES	MAYBE	NO	NO	NO	NO	NO	NO	NO
Full Main. 150% Drifter Total	113 sq ft 220 sq ft 333 sq ft	YES	YES	YES	MAYBE	NO	NO	NO	NO	NO	NO
Full Main 140% Genoa Total	113 sq ft 199 sq Ft 312 sq ft	YES	YES	YES	YES	MAYBE	NO	NO	NO	NO	NO
Full Main 130% Genoa Total	113 sq ft 172 sq ft 285 sq ft	YES	YES	YES	YES	MAYBE	NO	NO	NO	NO	NO
Full Main 120% Genoa Total	113 sq ft 159 sq ft 272 sq ft	YES	YES	YES	YES	YES	MAYBE	NO	NO	NO	NO
Full Main 110% Jib Total	113 sq ft 133 sq ft 246 sq ft	YES	YES	YES	YES	YES	MAYBE	NO	NO	NO	NO
Full Main 80% Jib Total	113 sq ft 106 sq ft 226 sq ft	YES	YES	YES	YES	YES	MAYBE	NO	NO	NO	NO
Main - 1 Reef 110% Jib Total	78 sq ft 133 sq ft 211 sq ft	YES	YES	YES	YES	YES	YES	NO	NO	NO	NO
Main 1- Reef 100% Jib Total	78 sq ft 106 sq ft 184 sq ft	NO	NO	NO	YES	YES	YES	NO	NO	NO	NO
Main-1 Reef 100 Jib 1 Reef Total	78 sq ft 90 sq ft 168 sq ft	NO	NO	NO	NO	YES	YES	YES	NO	NO	NO
Main - 2 Reefs 80 % Jib Total	58 sq ft 106 sq ft 164 sq ft	NO	NO	NO	NO	NO	YES	YES	NO	NO	NO
Main - 2 Reefs 110% Jib-1 Rf Total	58 sq ft 90 sq ft 148 sq ft	NO	NO	NO	NO	NO	NO	YES	YES	NO	NO
Storm Trys'l Storm Jib Total	36 sq ft 30 sq ft 66 sq ft	NO	NO	NO	NO	NO	NO	YES	YES	MAYBE	MAYBE

It should be noted that the information shown above includes a number of combinations that should not be used. They are included here for illustration purposes only. Read the disclaimer on Page Two for more information.

# and the Flicka

## The Flicka's Heal Angle

SAIL COMBINATION		10 Degrees 98%	15 Degrees 96%	20 Degrees 94%	25 Degrees 91%	30 Degrees 87%	35 Degrees 81%	40 Degrees 75%	45 Degrees 70%	50 Degrees 65%	55 Degrees 58%
Full Main Spinnaker Total	113 sq ft 398 sq ft 511 sq ft	501	492	481	466	445	414	384	358	333	297
Full Main Gennaker Total	113 sq Ft 259 sq Ft 372 sq Ft	366	357	350	339	324	301	279	260	242	186
Full Main. 150% Drifter Total	113 sq ft 220 sq ft 333 sq ft	326	320	313	330	290	270	250	233	216	193
Full Main 140% Genoa Total	113 sq ft 199 sq Ft 312 sq ft	305	303	293	284	271	253	234	218	203	181
Full Main 130% Genoa Total	113 sq ft 172 sq ft 285 sq ft	279	274	268	259	248	237	220	204	190	165
Full Main 120% Genoa Total	113 sq ft 159 sq ft 272 sq ft	267	261	256	248	237	220	204	190	177	158
Full Main 110% Jib Total	113 sq ft 133 sq ft 246 sq ft	242	236	231	224	214	199	185	172	160	143
Full Main 80% Jib Total	113 sq ft 106 sq ft 226 sq ft	221	217	212	206	197	183	169	158	147	131
Main - 1 Reef 110% Jib Total	78 sq ft 133 sq ft 211 sq ft	199	195	191	185	177	164	152	142	132	118
Main 1- Reef 100% Jib Total	78 sq ft 106 sq ft 184 sq ft	180	177	173	167	160	149	138	129	120	107
Main-1 Reef 100 Jib 1 Reef Total	78 sq ft 90 sq ft 168 sq ft	165	161	158	153	146	136	126	117	109	97
Main - 2 Reefs 80 % Jib Total	58 sq ft 106 sq ft 164 sq ft	161	158	154	149	143	132	123	115	107	95
Main - 2 Reefs 110% Jib-1 Rf Total	58 sq ft 90 sq ft 148 sq ft	86	84	86	76	71	66	62	57	51	44
Storm Trys'l Storm Jib Total	36 sq ft 30 sq ft 66 sq ft	64	63	62	60	57	53	49	46	43	33

**Flicka Friends - Spring 2001**

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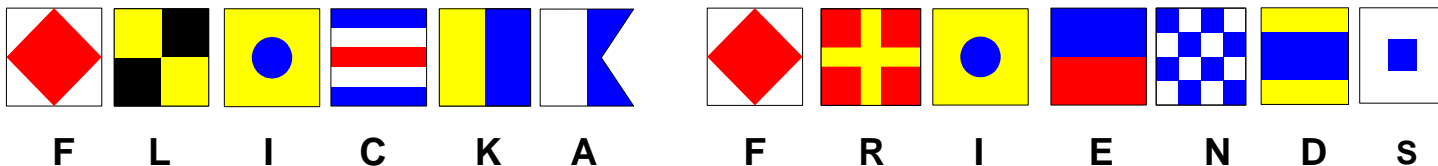
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