

## RodDNA – Number Magic

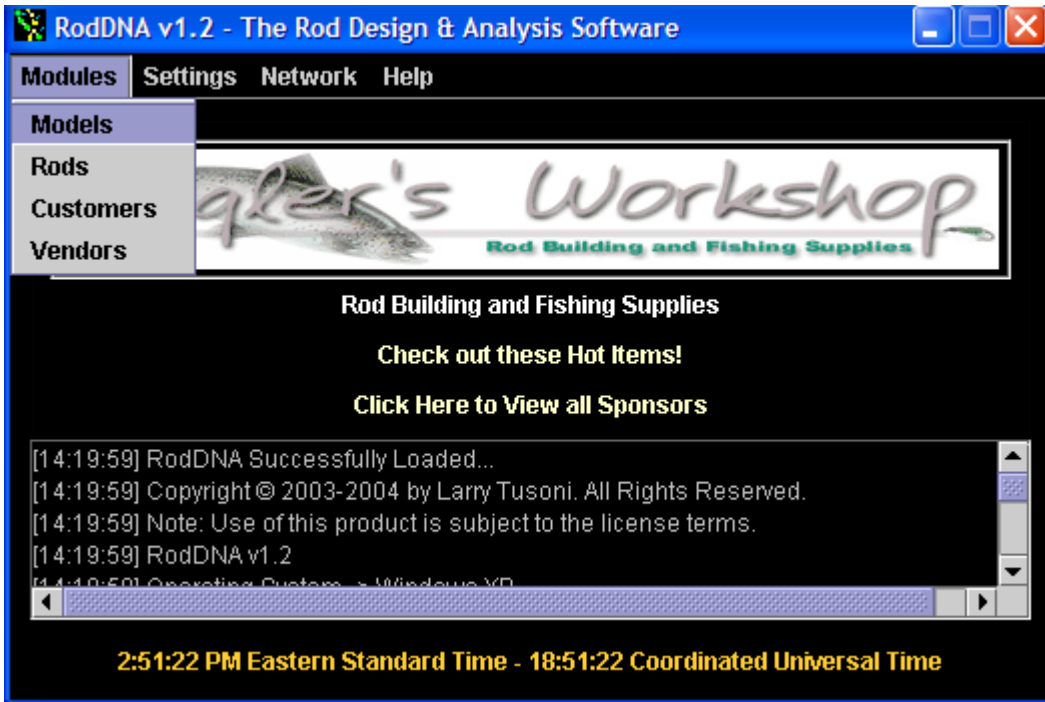
This is the second in RodDNA Tips and Tricks articles. Last article covered the basics of inputting a rod taper into RodDNA. That taper was taken on 5” centers. Because of the length of the article I did not cover how to deal with taper measurements that are not on 5” centers. The taper I have for this exercise is not on 5” centers. It is a Hawes taper I got from Hal Bacon at Grayling. The Hawes taper was given to me was on 3” centers. Likewise you will find a number of sources of tapers that are on what is considered today “odd” intervals. On example of these are found in Claude M. Kreider’s book “The Bamboo Rod and How to Build It”. These were presented on 6” centers. Likewise when you measure a rod you can take the taper at random odd intervals to get the best representation of the taper used and also to avoid taking measurements under guides and ferrules. Regardless of the source of the taper and interval the same technique is used to input the taper dimensions into RodDNA.

RodDNA will take the irregular station numbers and use a function that is called “interpolation” to calculate the “missing” numbers to generate the taper at 1” intervals and then present them to the rodmaker at 5” intervals.

The Hawes taper is for an 8’ 3piece 5-weight rod. The rod it was taken from had a Leonard Node Pattern (3x3) according to the notes. The taper is as follows:

Station	Tip	Mid	Butt
0	0.058	0.15	0.24
3	0.072	0.154	0.246
6	0.076	0.162	0.252
9	0.082	0.178	0.26
12	0.094	0.184	0.264
15	0.098	0.19	0.278
18	0.102	0.196	0.288
21	0.11	0.208	0.302
24	0.122	0.212	0.332
27	0.134	0.216	0.352
30	0.14	0.23	0.352
33	0.146	0.236	0.352

To begin with, lets assume you have RodDNA open on your computer and select the Models Module menu item to bring up the main models window:



Now you can select a place where you want to insert the new taper into the list of tapers you have displayed. The new taper will be inserted above the taper I have selected. This is exactly the same as described in my last article:

The screenshot shows the 'Models Module' software interface. The 'Edit' menu is open, with the 'Insert' option highlighted. The main window displays a table of fly rods. The 'Bogart Blueridge Banty Rod' is selected in row 11. Below the table, there are two charts: 'Stresses' and 'Dimensions', both for the selected rod. The 'Stresses' chart shows Rod Stress (psi) vs. inches from tip, and the 'Dimensions' chart shows Diameter in inches vs. inches from tip.

ID	Name	LengthInch	ActLngInch	Type	Const Type	Line Weig
1	Scarborough 8653 3/2	102	92	Fly-Rod	Hex	
2	Don 510/ 22	70	60	Fly-Rod	Hex	
3	Don 510/52	93	83	Fly-Rod	Hex	
4	6"	78	68	Casting-Rod	Hex	
5	6" three bucktail.	78	68	Casting-Rod	Hex	
6	6' 3/8-1/2 lures smaller	78	68	Casting-Rod	Hex	
7	our Sider 7052	84	74	Dry-Fly-Rod	Quad	
8	352	75	65	Fly-Rod	Hex	
9	643	90	80	Fly-Rod	Hex	
10	9 Bernard 7652	90	80	Fly-Rod	Hex	
11	10 Bogart Blueridge Banty Rod	59	49	Fly-Rod	Hex	
12	14 Bogart Chris Shenandoah Supreme Part 1	90	80	Fly-Rod	Hex	
13	15 Bogart Chris Shenandoah Supreme Part 2	90	80	Fly-Rod	Hex	
14	16 Bogart Chris Shenandoah Sweetheart	84	74	Fly-Rod	Hex	
15	17 Bogart Chris Yellow Rose 7022	84	74	Fly-Rod	Hex	
16	18 Bogart Chris Yellow Rose 7023	84	74	Fly-Rod	Hex	
17	19 Bogart Chris Yellow Rose 7033	84	74	Fly-Rod	Hex	
18	13 Bogart Chris Shenandoah Special	114	104	Fly-Rod	Hex	
19	11 Bogart Classic Wet Fly Rod	102	92	Fly-Rod	Hex	

**Bogart Blueridge Banty Rod 4' 11" 4wt 3p**

A good example of a quick little Banty that will t

**Stresses**  
Rod Stress Curve Chart  
psi (Stress) vs. inches from Tip (Dimensions)

**Dimensions**  
Rod Dimension Chart  
Diameter in Inches vs. inches from Tip (Dimensions)

As you can see, RodDNA has created a new taper entry in the database:

**Models Module**

File Edit Print Beveler/Mill Tools Import Network Help

Models Values Compare Values Details Chart Controlled Modification

ID#	DB#	Name	LengthInch	ActLength	Type	Const Type	Line Weig
1	0	Amherst Scarborough 8653 3/2	102	92	Fly-Rod	Hex	
2	1	Anderson Don 510/ 22	70	60	Fly-Rod	Hex	
3	2	Anderson Don 510/52	93	83	Fly-Rod	Hex	
4	3	Baitcast 6'6"	78	68	Casting-Rod	Hex	
5	4	Baitcast 6'6" three bucktail.	78	68	Casting-Rod	Hex	
6	5	Baitcast 6'6' 3/8-1/2 lures smaller	78	68	Casting-Rod	Hex	
7	6	Barnes Four Sider 7052	84	74	Dry-Fly-Rod	Quad	
8	7	Bernard 7352	75	65	Fly-Rod	Hex	
9	8	Bernard 7643	90	80	Fly-Rod	Hex	
10	9	Bernard 7652	90	80	Fly-Rod	Hex	
11	99999	***Please-Rename***	84	84	Dry-Fly-Rod	Hex	
12	10	Bogart Blueridge Banty Rod	59	49	Fly-Rod	Hex	
13	14	Bogart Chris Shenandoah Supreme Part 1	90	80	Fly-Rod	Hex	
14	15	Bogart Chris Shenandoah Supreme Part 2	90	80	Fly-Rod	Hex	
15	16	Bogart Chris Shenandoah Sweetheart	84	74	Fly-Rod	Hex	
16	17	Bogart Chris Yellow Rose 7022	84	74	Fly-Rod	Hex	
17	18	Bogart Chris Yellow Rose 7023	84	74	Fly-Rod	Hex	
18	19	Bogart Chris Yellow Rose 7033	84	74	Fly-Rod	Hex	
19	13	Bogart Chris Shenandoah Special	114	104	Fly-Rod	Hex	

**Bogart Blueridge Banty Rod 4' 11" 4wt 3p**

A good example of a quick little Banty that will t

**Stresses**

Rod Stress Curve Chart

**Dimensions**

Rod Dimension Chart

Now edit the taper name, length, action length, type, construction type line weight, number of sections and comments by clicking on each and entering the value desired:

**Models Module**

File Edit Print Beveler/Mill Tools Import Network Help

Models Values Compare Values Details Chart Controlled Modification

ID#	DB#	Name	LengthInch	ActLength	Type	Const Type	Line Weig
1	0	Amherst Scarborough 8653 3/2	102	92	Fly-Rod	Hex	
2	1	Anderson Don 510/ 22	70	60	Fly-Rod	Hex	
3	2	Anderson Don 510/52	93	83	Fly-Rod	Hex	
4	3	Baitcast 6'6"	78	68	Casting-Rod	Hex	
5	4	Baitcast 6'6" three bucktail.	78	68	Casting-Rod	Hex	
6	5	Baitcast 6'6' 3/8-1/2 lures smaller	78	68	Casting-Rod	Hex	
7	6	Barnes Four Sider 7052	84	74	Dry-Fly-Rod	Quad	
8	7	Bernard 7352	75	65	Fly-Rod	Hex	
9	8	Bernard 7643	90	80	Fly-Rod	Hex	
10	9	Bernard 7652	90	80	Fly-Rod	Hex	
11	99999	Bogart Hawes Rod	96	96	Dry-Fly-Rod	Hex	
12	10	Bogart Blueridge Banty Rod	59	49	Fly-Rod	Hex	
13	14	Bogart Chris Shenandoah Supreme Part 1	90	80	Fly-Rod	Hex	
14	15	Bogart Chris Shenandoah Supreme Part 2	90	80	Fly-Rod	Hex	
15	16	Bogart Chris Shenandoah Sweetheart	84	74	Fly-Rod	Hex	
16	17	Bogart Chris Yellow Rose 7022	84	74	Fly-Rod	Hex	
17	18	Bogart Chris Yellow Rose 7023	84	74	Fly-Rod	Hex	
18	19	Bogart Chris Yellow Rose 7033	84	74	Fly-Rod	Hex	
19	13	Bogart Chris Shenandoah Special	114	104	Fly-Rod	Hex	

**Bogart Hawes Rod 8' 0" 5wt 3p**

This is a Hawes Taper received from Hal Bacon done on 3" centers with a Leonard Node Pattern.

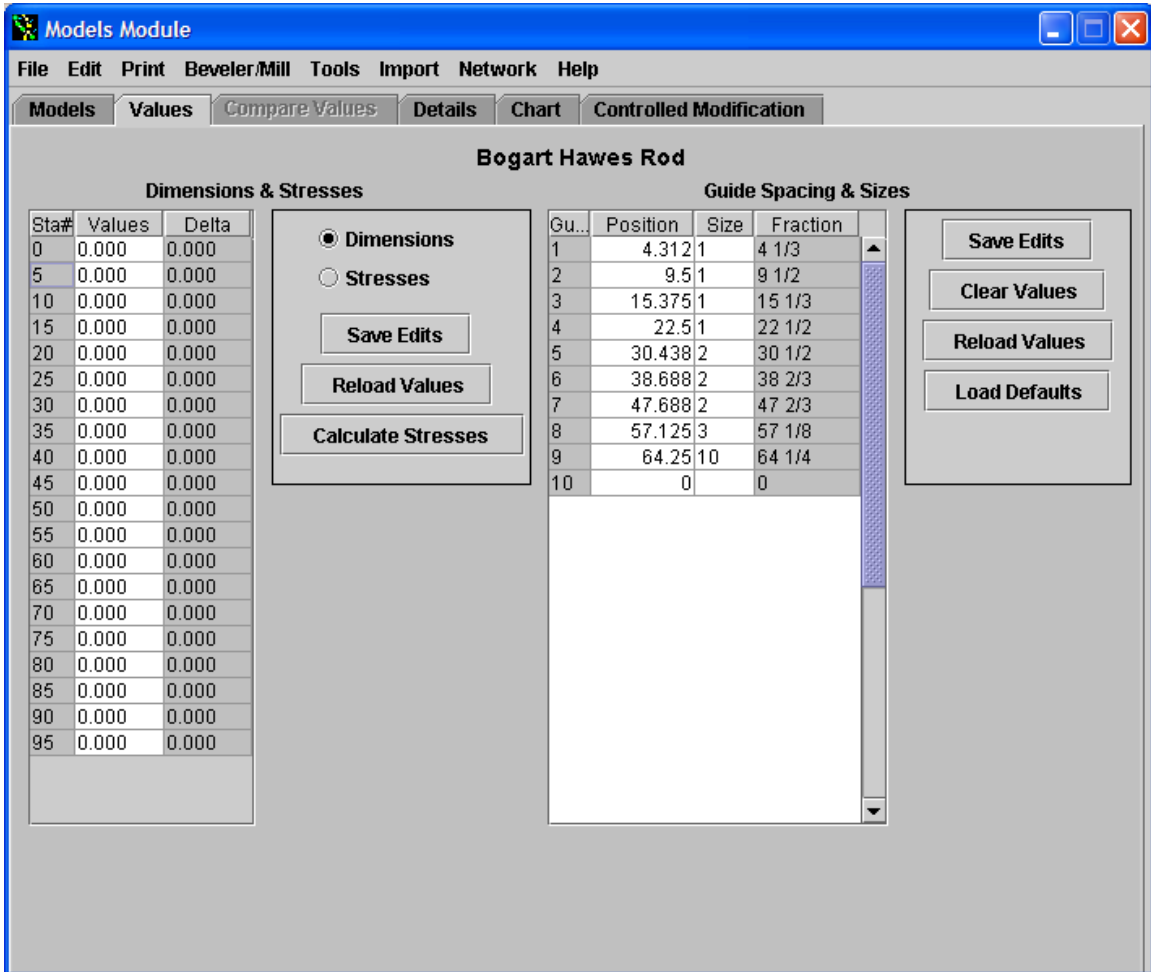
**Stresses**

Rod Stress Curve Chart

**Dimensions**

Rod Dimension Chart

Now we are ready for the tip and trick part of the lesson. We have all the essential information on this rod entered except taper values. In the last article we clicked on the Values tab in the Models Module window. If you do that you notice that you are prompted to enter the values in 5" increments:



When you have a taper at odd increments (other than 5") then you must do the following. In the Models tab scroll over to the Dimensions field using the bottom slide bar. Your selected taper will be highlighted to keep you orientated. You will notice that this field is empty:

The screenshot shows the 'Models Module' software interface. The main window displays a list of models under the 'Dimensions' column. The selected model is 'Bogart Hawes Rod 8' 0" 5wt 3p'. Below the list, there is a text description: 'This is a Hawes Taper received from Hal Bacon done on 3" centers with a Leonard Node Pattern.' To the right of the text are two charts: 'Stresses' and 'Dimensions'. The 'Stresses' chart is titled 'Rod Stress Curve Chart' and shows a curve of stress versus distance from the tip. The 'Dimensions' chart is titled 'Rod Dimension Chart' and shows a curve of diameter versus distance from the tip.

Model Name	Dimensions
	0.077, 0.106, 0.111, 0.121, 0.141, 0.154, 0.171, 0.177, 0.200, 0.214, 0.2...
. Have landed Cuts up ...	0.060, 0.069, 0.089, 0.104, 0.114, 0.126, 0.140, 0.156, 0.170, 0.182, 0.1...
ast tip rods. my grips a...	0.071, 0.078, 0.100, 0.117, 0.131, 0.144, 0.156, 0.168, 0.181, 0.194, 0.2...
	0.107, 0.119, 0.138, 0.153, 0.189, 0.203, 0.217, 0.239, 0.266, 0.27, 0.30...
	0.111, 0.137, 0.152, 0.179, 0.205, 0.235, 0.248, 0.263, 0.287, 0.306, 0.3...
	0.103, 0.114, 0.13, 0.144, 0.173, 0.196, 0.21, 0.23, 0.257, 0.266, 0.296, ...
de this quad and really ...	0.062, 0.076, 0.100, 0.106, 0.132, 0.146, 0.160, 0.172, 0.184, 0.196, 0.2...
heet rod for small strea...	0.076, 0.092, 0.113, 0.134, 0.149, 0.163, 0.180, 0.201, 0.212, 0.237, 0.2...
	0.073, 0.085, 0.098, 0.109, 0.122, 0.130, 0.145, 0.168, 0.190, 0.200, 0.2...
7"	0.085, 0.111, 0.118, 0.126, 0.140, 0.170, 0.180, 0.199, 0.213, 0.221, 0.2...
tern.	
	0.054, 0.064, 0.080, 0.098, 0.114, 0.130, 0.146, 0.162, 0.180, 0.210, 0.2...
	0.062, 0.082, 0.098, 0.114, 0.130, 0.146, 0.160, 0.174, 0.186, 0.200, 0.2...
	0.064, 0.086, 0.102, 0.120, 0.138, 0.156, 0.170, 0.184, 0.196, 0.210, 0.2...
	0.070, 0.080, 0.094, 0.104, 0.125, 0.130, 0.148, 0.160, 0.174, 0.174, 0.1...
ow called "Yellow Ros...	0.062, 0.068, 0.088, 0.102, 0.116, 0.128, 0.140, 0.150, 0.166, 0.180, 0.1...
	0.062, 0.068, 0.088, 0.102, 0.114, 0.124, 0.140, 0.152, 0.168, 0.180, 0.1...
	0.066, 0.074, 0.094, 0.108, 0.122, 0.134, 0.148, 0.162, 0.176, 0.184, 0.1...
	0.070, 0.084, 0.104, 0.128, 0.144, 0.158, 0.172, 0.186, 0.200, 0.218, 0.2...

**Bogart Hawes Rod 8' 0" 5wt 3p**

This is a Hawes Taper received from Hal Bacon done on 3" centers with a Leonard Node Pattern.

**Stresses**  
Rod Stress Curve Chart  
Y-axis: Rod (Stress) (0 to 75,000)  
X-axis: Inches from Tip (Dimensions) (0 to 75)  
Legend: BogartHawes Rod

**Dimensions**  
Rod Dimension Chart  
Y-axis: Diameter in Inches (0.00 to 1.00)  
X-axis: Inches from Tip (Dimensions) (0 to 75)  
Legend: BogartHawes Rod

Now you take your mouse and click on the empty dimension field. You will have a new window will pop-up. This is the Models Taper Dimension window:

**Model Taper Dimensions**

Enter dimensions starting at station #0 or enter station # and associated dimension.

Dimensions Only    .032 45 056 etc.    Station Increment = 5"

Station and Dimensions    0 .032 5 45 10 056 etc.

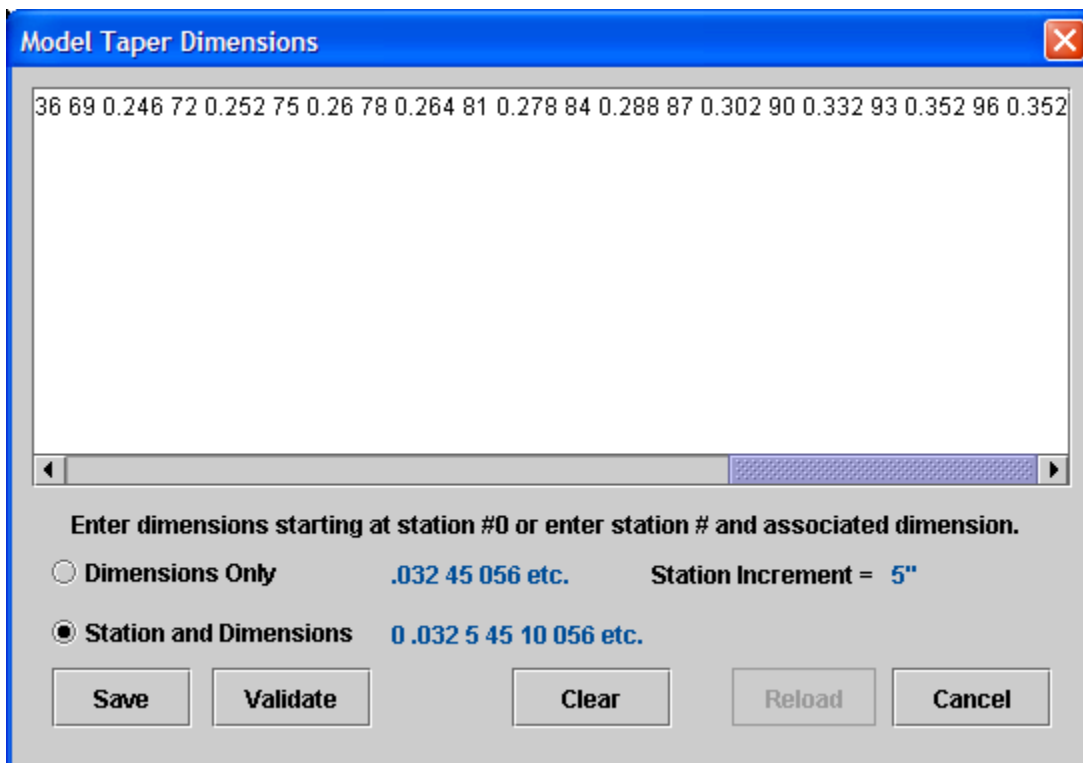
Save    Validate    Clear    Reload    Cancel



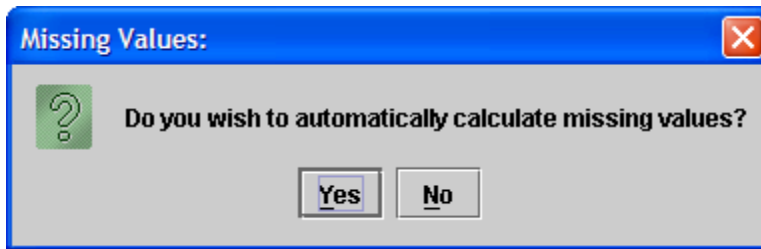
Notice the button for Station and Dimensions is clicked that will allow you to put in a station and dimension in a list. To generate the list I use the windows word pad application as an editor to get the following list to input: 0 0.058 3 0.072 6 0.076 9 0.082 12 0.094 15 0.098 18 0.102 21 0.11 24 0.122 27 0.134 30 0.14 33 0.146 36 0.154 39 0.162 42 0.178 45 0.184 48 0.19 51 0.196 54 0.208 57 0.212 60 0.216 63 0.23 66 0.236 69 0.246 72 0.252 75 0.26 78 0.264 81 0.278 84 0.288 87 0.302 90 0.332 93 0.352 96 0.352

In generating this list, I had to do a minor modification of the original taper. The way the taper was given to me was as the planing form settings reflecting a slight step-down for each section. For the purpose of this exercise I ignored the 0" setting for the Mid and Butt sections. There were several other options to how to treat this taper numbers but this is another discussion in itself. The point of this exercise is to deal with an odd taper like this. We can always clean up the taper in the next exercise.

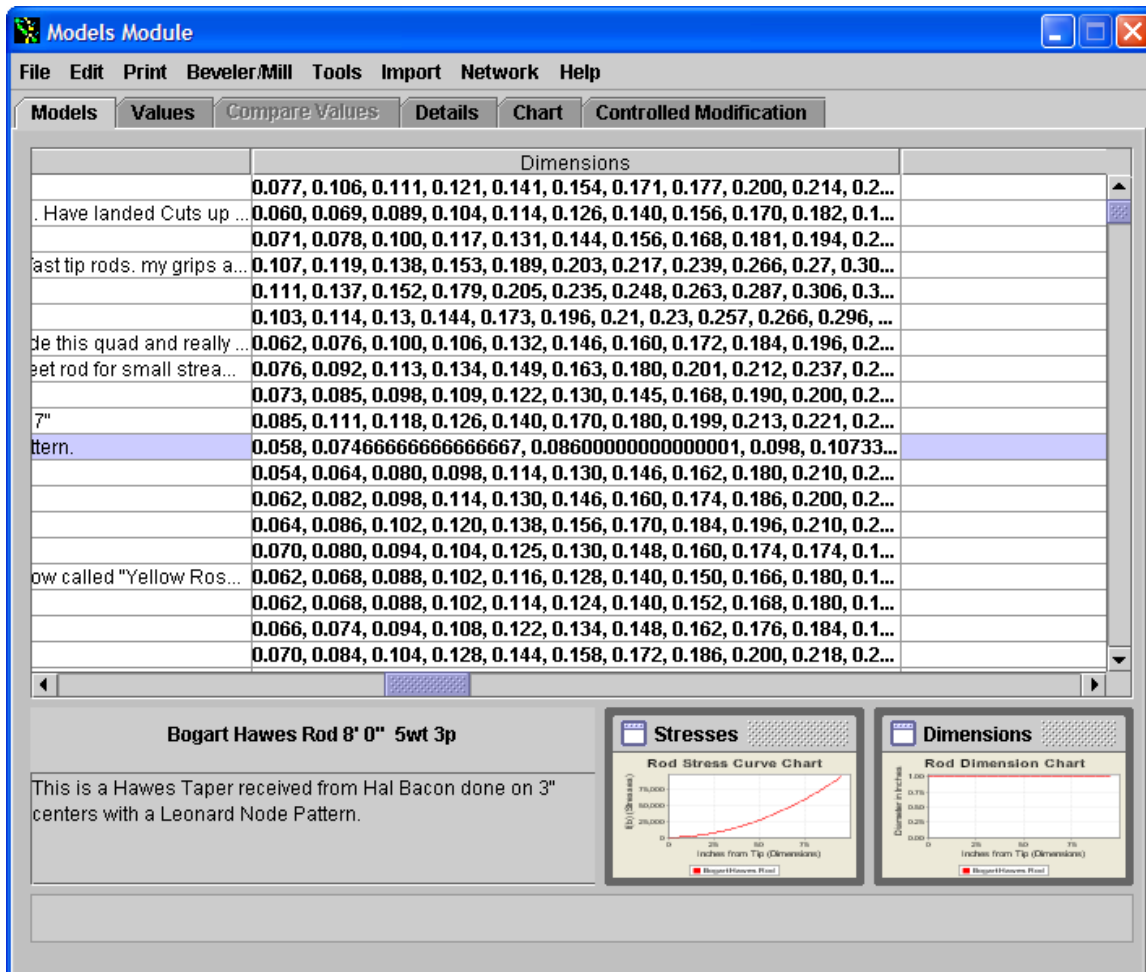
Now just cut and paste the numbers into the Model Taper Dimensions window:



Now click the “Save” button and a window will pop-up and ask if you want it to automatically calculate the missing values. This is where number magic occurs. Click on “Yes”:



The pop-up will disappear and you will see the Models Module window with values filled in:



If you scroll back to the left, select any other item and then click back on the taper we have just entered, the Stresses and Dimensions thumbnails will be updated:

**Models Module**

File Edit Print Beveler/Mill Tools Import Network Help

Models Values Compare Values Details Chart Controlled Modification

ID#	DB#	Name	LengthInch	ActLength	Type	Const Type	Line Weig
1	0	Amherst Scarborough 8653 3/2	102	92	Fly-Rod	Hex	
2	1	Anderson Don 510/ 22	70	60	Fly-Rod	Hex	
3	2	Anderson Don 510/52	93	83	Fly-Rod	Hex	
4	3	Baitcast 6'6"	78	68	Casting-Rod	Hex	
5	4	Baitcast 6'6" three bucktail.	78	68	Casting-Rod	Hex	
6	5	Baitcast 6'6" 3/8-1/2 lures smaller	78	68	Casting-Rod	Hex	
7	6	Barnes Four Sider 7052	84	74	Dry-Fly-Rod	Quad	
8	7	Bernard 7352	75	65	Fly-Rod	Hex	
9	8	Bernard 7643	90	80	Fly-Rod	Hex	
10	9	Bernard 7652	90	80	Fly-Rod	Hex	
11	99999	Bogart Hawes Rod	96	96	Dry-Fly-Rod	Hex	
12	10	Bogart Blueridge Banty Rod	59	49	Fly-Rod	Hex	
13	14	Bogart Chris Shenandoah Supreme Part 1	90	80	Fly-Rod	Hex	
14	15	Bogart Chris Shenandoah Supreme Part 2	90	80	Fly-Rod	Hex	
15	16	Bogart Chris Shenandoah Sweetheart	84	74	Fly-Rod	Hex	
16	17	Bogart Chris Yellow Rose 7022	84	74	Fly-Rod	Hex	
17	18	Bogart Chris Yellow Rose 7023	84	74	Fly-Rod	Hex	
18	19	Bogart Chris Yellow Rose 7033	84	74	Fly-Rod	Hex	
19	13	Bogart Chris Shenandoah Special	114	104	Fly-Rod	Hex	

**Bogart Hawes Rod 8' 0" 5wt 3p**

This is a Hawes Taper received from Hal Bacon done on 3" centers with a Leonard Node Pattern.

**Stresses**

Y-axis: psi (Stress) 0 to 300,000  
X-axis: inches from Tip (Dimensions) 0 to 75

**Dimensions**

Y-axis: Diameter (inches) 0 to 0.3  
X-axis: inches from Tip (Dimensions) 0 to 75

Lastly, now click on the “Values” tab and you will see the 5” dimensions listed:

**Models Module**

File Edit Print Beveler/Mill Tools Import Network Help

Models Values Compare Values Details Chart Controlled Modification

**Bogart Hawes Rod**

**Dimensions & Stresses**

Sta#	Values	Delta
0	0.058	0.000
5	0.075	0.017
10	0.086	0.011
15	0.098	0.012
20	0.107	0.009
25	0.126	0.019
30	0.140	0.014
35	0.151	0.011
40	0.167	0.016
45	0.184	0.017
50	0.194	0.010
55	0.209	0.015
60	0.216	0.007
65	0.260	0.044
70	0.332	0.072
75	0.000	-0.332
80	0.000	0.000
85	0.000	0.000
90	0.000	0.000
95	0.000	0.000

Dimensions  
 Stresses

Save Edits  
Reload Values  
Calculate Stresses

**Guide Spacing & Sizes**

Gu...	Position	Size	Fraction
1	4.312	1	4 1/3
2	9.5	1	9 1/2
3	15.375	1	15 1/3
4	22.5	1	22 1/2
5	30.438	2	30 1/2
6	38.688	2	38 2/3
7	47.688	2	47 2/3
8	57.125	3	57 1/8
9	64.25	10	64 1/4
10	0		0

Save Edits  
Clear Values  
Reload Values  
Load Defaults

However there is one small problem – the ferrule sizes have not been calculated. Scroll over to where the ferrule sizes are listed and you will see this. This will affect the stress curve. Calculating the ferrule size is easy to do. You can manually put the sizes in or you can let RodDNA automatically calculate it for you. To do so select the “tools” menu and select “Calculate Ferrule Sizes & Positions & Tip Top Size for Selected Models:

**Models Module**

File Edit Print Beveler/Mill **Tools** Import Network Help

Models Values Compar

**Validate All Models**

- Calculate Ferrule Sizes & Positions & Tip Top Size for Selected Models
- Calculate Rod Sections
- Save current sort state
- Set Line Length & Cast for Selected Models
- Calculate LWV and RAV for Selected Models

Line Cast	Pieces	F1Siz	Location	TipTc
50	3	11/64	5	
35	2	11/64	4	
50	2	14/64	5	
45	1	None	7	
45	1	None	7.5	
45	1	None	7	
50	2	13/64	4	
50	2	12/64	5	
45	3	11/64	5	
50	2	14/64	6	
45	3	22/64	4.5	
45	3	9/64	3.5	
45	3	11/64	4	
50	3	11/64	4	
45	2	13/64	5	
35	2	13/64	4	
35	3	11/64	4	
40	3	11/64	4.5	
60	3	12/64	5	

**Bogart Hawes Rod 8' 0" 5wt 3p**

This is a Hawes Taper received from Hal Bacon done on 3" centers with a Leonard Node Pattern.

**Stresses**

**Rod Stress Curve Chart**

**Dimensions**

**Rod Dimension Chart**

You will now notice the ferrule sizes are filled in. If you click off the taper and back on it, the thumbnails will again be updated since RodDNA dynamically calculates these values:

The screenshot shows the 'Models Module' window in RodDNA. The 'Values' tab is active, displaying a table with columns: Line Cast, Pieces, F1Size, F2Size, F3Size, Ferrule Type, F1Location, F2Location, F3Location, and Tip. The table contains 20 rows of data for various rod casts. Below the table, the rod is identified as 'Bogart Hawes Rod 8' 0" 5wt 3p'. A text box describes it as a Hawes Taper received from Hal Bacon, done on 3" centers with a Leonard Node Pattern. To the right, there are two charts: 'Stresses' (Rod Stress Curve Chart) and 'Dimensions' (Rod Dimension Chart), both showing data for the 'BogartHawes Rod'.

Line Cast	Pieces	F1Size	F2Size	F3Size	Ferrule Type	F1Location	F2Location	F3Location	Tip
50	3	11/64	17/64	None	NS-(Standard)	34.00	68.00	0.00	5
35	2	11/64	None	None	NS-(Standard)	35.00	0.00	0.00	4
50	2	14/64	None	None	NS-(Standard)	46.50	0.00	0.00	5
45	1	None	None	None	NS-(Standard)	0.00	0.00	0.00	7
45	1	None	None	None	NS-(Standard)	0.00	0.00	0.00	7.5
45	1	None	None	None	NS-(Standard)	0.00	0.00	0.00	7
50	2	13/64	None	None	NS-(Standard)	42.00	0.00	0.00	4
50	2	12/64	None	None	NS-(Standard)	37.50	0.00	0.00	5
45	3	11/64	17/64	None	NS-(Standard)	30.00	60.00	0.00	5
50	2	14/64	None	None	NS-(Standard)	45.00	0.00	0.00	6
45	3	9/64	16/64	None	NS-(Standard)	32.00	64.00	0.00	4
45	3	9/64	13/64	None	NS-(Standard)	19.67	39.33	0.00	3.5
45	3	11/64	17/64	None	NS-(Standard)	30.00	60.00	0.00	4
50	3	11/64	17/64	None	NS-(Standard)	30.00	60.00	0.00	4
45	2	13/64	None	None	NS-(Standard)	42.00	0.00	0.00	5
35	2	13/64	None	None	NS-(Standard)	42.00	0.00	0.00	4
35	3	11/64	16/64	None	NS-(Standard)	28.00	56.00	0.00	4
40	3	11/64	16/64	None	NS-(Standard)	28.00	56.00	0.00	4.5
60	3	12/64	18/64	None	NS-(Standard)	38.00	76.00	0.00	5

That completes this RodDNA Number Magic Tips and Tricks article. You can now save the file or just the taper using the File functions or decide to discard the edits you have done in this lesson. What is important is that you can input a taper with any station spacing and RodDNA will automatically convert it to you and display it in a normalized form.

The ability to do this makes RodDNA a powerful tool. Now you can evaluate the taper and “smooth” the stress curve or even convert it to a 2-piece rod. At this point, I would go back and look at the transitions between the sections that we quickly jumped over when we inputted the number.

This completes the Number Magic article and I hope rodmakers will explore it’s capabilities when dealing with inputting taper data and allow them to take more measurements of a cherished rod to allow a better representation of the taper.