Part 3

Common Cents & the Rosetta Stone

The most elegantly constructed fly rod will not satisfy your client unless fitted with the correct line. Here is how to define this line without the usual "trial and error" process.

by William "Dr. Bill" Hanneman

Part 1 of this series (RodMaker Vol. 6, No. 2, 2003) introduced the Common Cents System, including the Defined Bending Index (DBI) and its two components, Intrinsic Power (IP) and Action Angle (AA). These purely objective measurements allow you to characterize any fly rod in unambiguous terms.

Part 2 (RodMaker Vol. 6, No. 3, 2003) demonstrated how to create The Big Picture by plotting the DBI as a function of blank length. This reveals the fundamental structure of that rod.

Part 3 shows how to define the correct line for optimally loading a fly rod. The Weight of Line (WL) required to load a rod is a function of its IP. With the IP known, the fly line appropriate for the distance you expect to cast can be defined. (If one's casting speed is sufficiently above average, one can use a lighter line - if slower, a heavier line. However, that is a personal idiosyncrasy. This treatment assumes an average casting speed.)

Forty-plus years ago, the AFTMA line committee set arbitrary weight standards for their Line Numbers. Subsequently, a fly rod loaded by 30 feet of an AFTMA No. 5 Line became known as a 5-weight rod. However, without a definition of the term, loaded, no objective standards for a 5-weight rod could be established. Consequently, manufacturers label rods subjectively, using the AFTMA Line No. their designers recommend.

Unfortunately, those subjective decisions are influenced by each designer's philosophy, marketing goal, casting style, and/or skill. They ignore both the capabilities of the average angler and the intrinsic properties of the rod itself. Today, any rod bearing the inscription No. 5 Line, irrespective of its IP, is called a 5-weight rod. This makes it impossible to objectively compare rods from different sources. This should not be.

The Common Cents System defines the term loaded. Then, within the framework of the AFTMA fly line standards, there is a definable relationship between the IP of a rod and the weight of line which will optimally load that rod. Consequently, the term "5-weight rod" carries an implicit definition of that rod's IP. The relationship between rod IP and AFTMA Line No. is summarized in Table A, The Rosetta Stone of Fly Lines and Rods. continued...

Table A

Rosetta Stone of Fly Lines and Rods

AFTMA Lines

Line No.	Weight grains	Dividing Weight, grains	ELN
		30	0.0
0	40		0.5
		50	1.0
1	60		1.5
		70	2.0
2	80		2.5
		90	3.0
3	100		3.5
		110	4.0
4	120		4.5
		130	5.0
5	140		5.5
		150	6.0
6	160		6.5
		172.5	7.0
7	185		7.5
		197.5	8.0
8	210		8.5
		225	9.0
9	240		9.5
		260	10.0
10	280		10.5
		305	11.0
11	330		11.5
		350	12.0
12	380		12.5
		415	13.0
13	450		13.5
		475	14.0
14	500		14.5
		525	15.0
15	550		15.5
		575	16.0

DBI Rods

Intrinsic Power, grains	Dividing Weight,	ERN	Cents
	130	0.0	3.4
340		.05	8.8
	550	1.0	14.2
670		1.5	17.4
	790	2.0	20.5
920		2.5	23.8
	1050	3.0	27.2
1180		3.5	30.6
	1310	4.0	33.9
1440		4.5	37.3
	1570	5.0	40.7
1685		5.5	43.6
	1830	6.0	47.4
1973		6.5	51.1
	2115	7.0	54.8
2270		7.5	58.8
	2425	8.0	62.8
2580		8.5	66.8
	2760	9.0	71.5
2940		9.5	76.1
	3170	10.0	82.1
3400		10.5	88.1
	3680	11.0	95.3
3960		11.5	102.6
	4240	12.0	109.8
4520		12.5	117.1
	4900	13.0	126.9
5280		13.5	136.8
	5560	14.0	144.0
5840		14.5	151.3
	6120	15.0	158.5
6400		15.5	165.8
	6680	16.0	173.0

Cents/ERN

10/0.61	65/8.28	120/12.65
11/0.70	66/8.40	121/12.70
12/0.79	67/8.52	122/12.75
13/0.89	68/8.63	123/12.80
14/0.98	69/8.73	124/12.85
15/1.12	70/8.84	125/12.90
16/1.28	71/8.95	126/12.95
17/1.44	72/9.05	127/13.01
18/1.60	73/9.16	128/13.06
19/1.77	74/9.27	129/13.11
20/1.92	75/9.38	130/13.16
21/2.08	76/9.49	131/13.21
22/2.23	77/9.58	132/13.26
23/2.38	78/9.66	133/13.31
24/2.53	79/9.74	134/13.36
25/2.67	80/9.83	135/13.41
26/2.82	81/9.91	136/13.46
27/2.97	82/9.99	137/13.51
28/3.12	83/10.08	138/13.58
29/3.27	84/10.16	139/13.65
30/3.42	85/10.24	140/13.72
31/3.57	86/10.33	141/13.79
32/3.72	87/10.41	142/13.86
33/3.86	88/10.49	143/13.93
34/4.01	89/10.56	144/14.00
35/4.16	90/10.63	145/14.07
36/4.31	91/10.70	146/14.14
37/4.46	92/10.77	147/14.21
38/4.60	93/10.84	148/14.27
39/4.75	94/10.91	149/14.34
40/4.90	95/10.98	150/14.41
41/5.05	96/11.05	151/14.48
42/5.20	97/11.12	152/14.55
43/5.35	98/11.18	153/14.62
44/5.50	99/11.25	154/14.69
45/5.65	100/11.32	155/14.76
46/5.79	101/11.39	156/14.83
47/5.94	102/11.46	157/14.90
48/6.08	103/11.53	158/14.97
49/6.22	104/11.60	159/15.03
50/6.35	105/11.67	160/15.10
51/6.49	106/11.74	161/15.17
52/6.62	107/11.81	162/15.24
53/6.76	108/11.88	163/15.31
54/6.89	109/11.94	164/15.38
55/7.03	110/12.01	165/15.45
56/7.15	111/12.08	166/15.51
57/7.28	112/12.15	167/15.58
58/7.40	113/12.22	168/15.65
59/7.53	114/12.29	169/15.72
60/7.65	115/12.36	170/15.79
61/7.78	116/12.42	171/15.86
62/7.90	117/12.49	172/15.93
63/8.03	118/12.55	173/16.00
64/8.15	119/12.60	

Common Cents

Using the Common Cents System, you can objectively measure the IP of any fly rod. For example, to determine the IP of a 9 ft. (108 in.) rod, secure it in a horizontal position on a shelf about five feet high and measure the height of the horizontal butt section just ahead of the grip (e.g., 64″). Then, attach a lightweight plastic bag to the tip top and add one cent pieces (minted after 1996) until the tip is deflected one third of its length (i.e., 36″) downward to a point 28″ above the floor. Count the number of one cent pieces (e.g., 44). This represents the rod's IP measured in common cents.

Trout Rod Lines

Trout rods are designed to be loaded by AFTMA Line Numbers 0 through 6. To determine the Effective Rod Number (ERN) of the rod measured above (44 cents), consult Figure 1. This shows its ERN = 5.5 which falls in the middle of the AFTMA No. 5 Line range (ELN = 5.5). Under average casting conditions it will be optimally loaded by a line 30 feet long weighing 140 grains (WL = 140). The term WL is defined as the Weight of aerialized Line required to optimally load that rod.

WL is the determining factor for insuring enjoyable casting experiences. It is actualized when the rod is loaded — the line extending straight backwards. That weight is an intrinsic property of each rod. It is independent of any line construction, length, weight, taper, or coating. It is independent of whether one casts a wide or narrow loop. The owner of every rod should know this number.

WL is purely an objective number. It tells you nothing about AFTMA Line No. or length of line comprising that weight. Nevertheless, you must know this number before you can begin to choose your correct line.

Next, you must know the length of line intended to be aerialized. Then, using Figure 2, you can objectively choose the line which will provide that weight and optimally load your rod.

In the above example, IP = 44 cents and WL = 140 grains. Figure 2 shows this weight of line can be derived from 20 ft. of a mid range AFTMA No. 8 line, 23 ft. of a No. 7 line, 26 ft. of a No. 6 line, 30 ft. of a No. 5 line, 35 ft. of a No. 4 line, or 42 ft. of a No. 3 line. (When casting less than 20 ft. of line, one doesn't fully load the rod.)

Figure 2 also illustrates why, by simply adjusting line length, any angler can use almost any rod to cast almost any line. Actually, this is what every beginner does with his first fly fishing outfit.

Powerful Rod Lines

Rods using AFTMA Line Numbers 7 and above are used for casting longer lengths of line (>30 feet) and/or heavier lines of diverse tapers.

Matching lines to these rods again involves matching the WL to the IP of the rod. To do this, load that rod and count those cents (e.g., 59). Then, use either the upper heavy line in Figure 3 or the following formula to determine the WL in grains to optimally load your rod.

Weight of Line in grains = 3.33 (number of cents) - 10
WL = 3.33(59) -10 = 196 -10 = 186 grains.

This value (186 grains), according to Table A and Figure 3, corresponds to 30 ft. of a mid-range AFTMA No. 7 line. One would expect such a rod to be called a 7-weight rod and be inscribed AFTMA No. 7 Line.

However, you will also note Figure 4 shows 186 grains of line (WL) corresponds to 35 ft. of No. 6 line, 40 ft. of No. 5 line, and 46 ft. of No. 4 line. Now, if a manufacturer defies convention and arbitrarily changes the length of aerialized line on which AFTMA Line Numbers are based, two things will happen — neither of which is beneficial.

(1) The meaning and usefulness of AFTMA standards will be destroyed.

(2) One can rationalize inscribing the above rod for a No. 6 Line, No. 5 Line, or even No. 4 Line. Unfortunately, precisely this is happening.

Confusing Practices

Rod manufacturers recognize anglers want to cast farther and catch larger fish using lighter and lighter equipment. It is far more impressive to brag about making a 70 ft. cast and landing a steelhead with a 5-weight rod than with a 7-weight rod.

Newer generations of graphite allow the construction of stronger rods (i.e., greater IP) of lighter avoirdupois weights. Consequently, we now find rods with IP values corresponding to AFTMA No. 7 lines bearing the label "No. 5 Line" and sold to anglers as 5-weight rods. This is the consequence of an "unofficial" movement to redefine AFTMA fly line weight on the basis of 40 feet — rather than the universally accepted standard of 30 feet.

Not surprisingly, when these so called 5-weight rods are pitted against actual 5-weight rods, they always win the distance competitions. Pleasurable fishing for smaller trout is another matter. When uninformed anglers try to fish with these rods, they find they need AFTMA No. 7 lines to properly load them. Conveniently omitted on these rods is the notation one needs to aerialize 40 ft. of line to optimally load them.

A fly rod should be rated according to its IP — not varying lengths of line. The Common Cents System does just this.

Figure 1

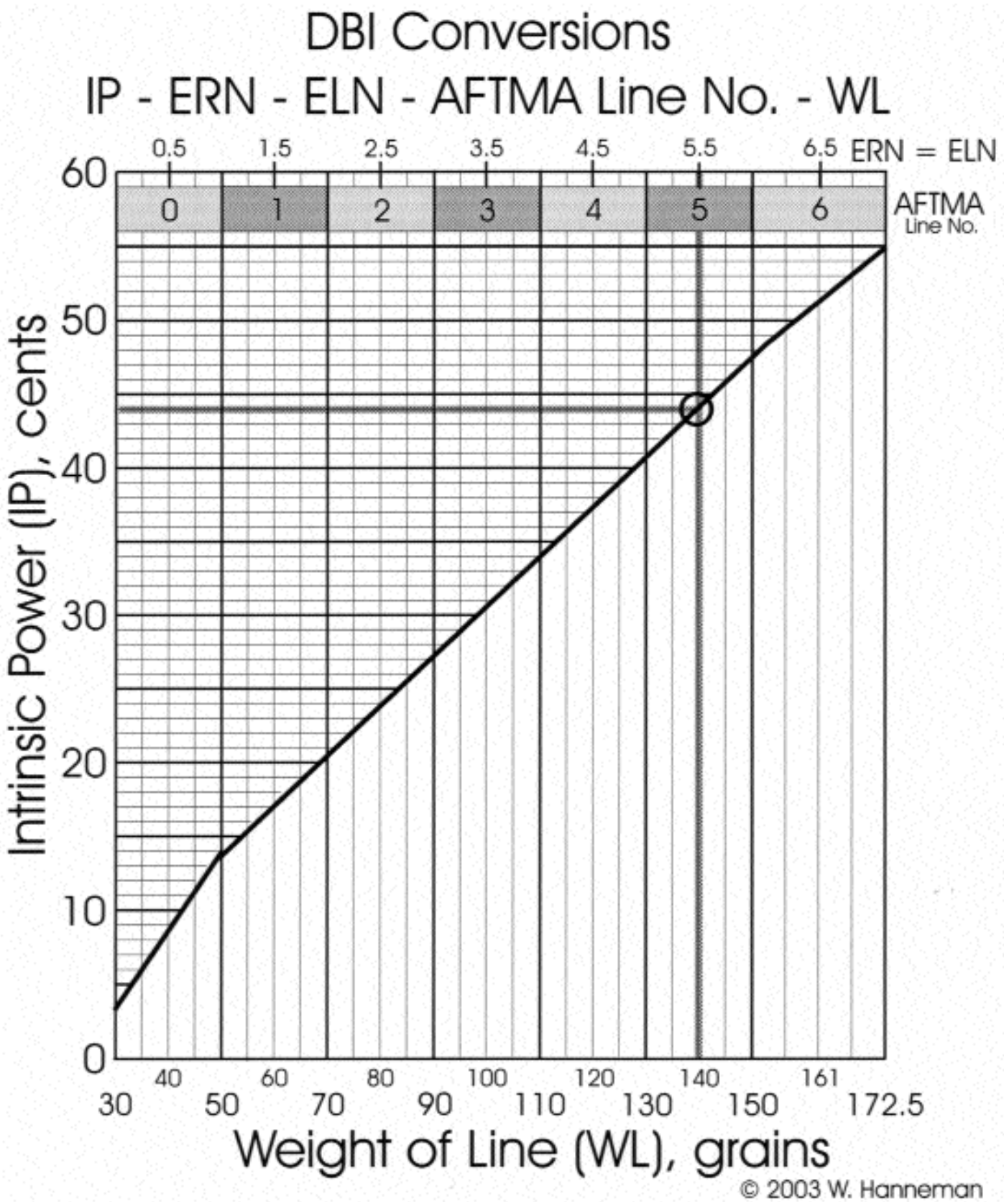
DBI Conversions
IP - ERN - ELN - AFTMA Line No. - WL
0.5
1.5
2.5
3.5
4.5
5.5
6.5
ERN = ELN
0
1
2
3
4
5
6
AFTMA
Line No.
60
50
40
30
20
10
0
Intrinsic Power (IP), cents
40
60
80
100
120
140
161
30
50
70
90
110
130
150
172.5
Weight of Line (WL), grains
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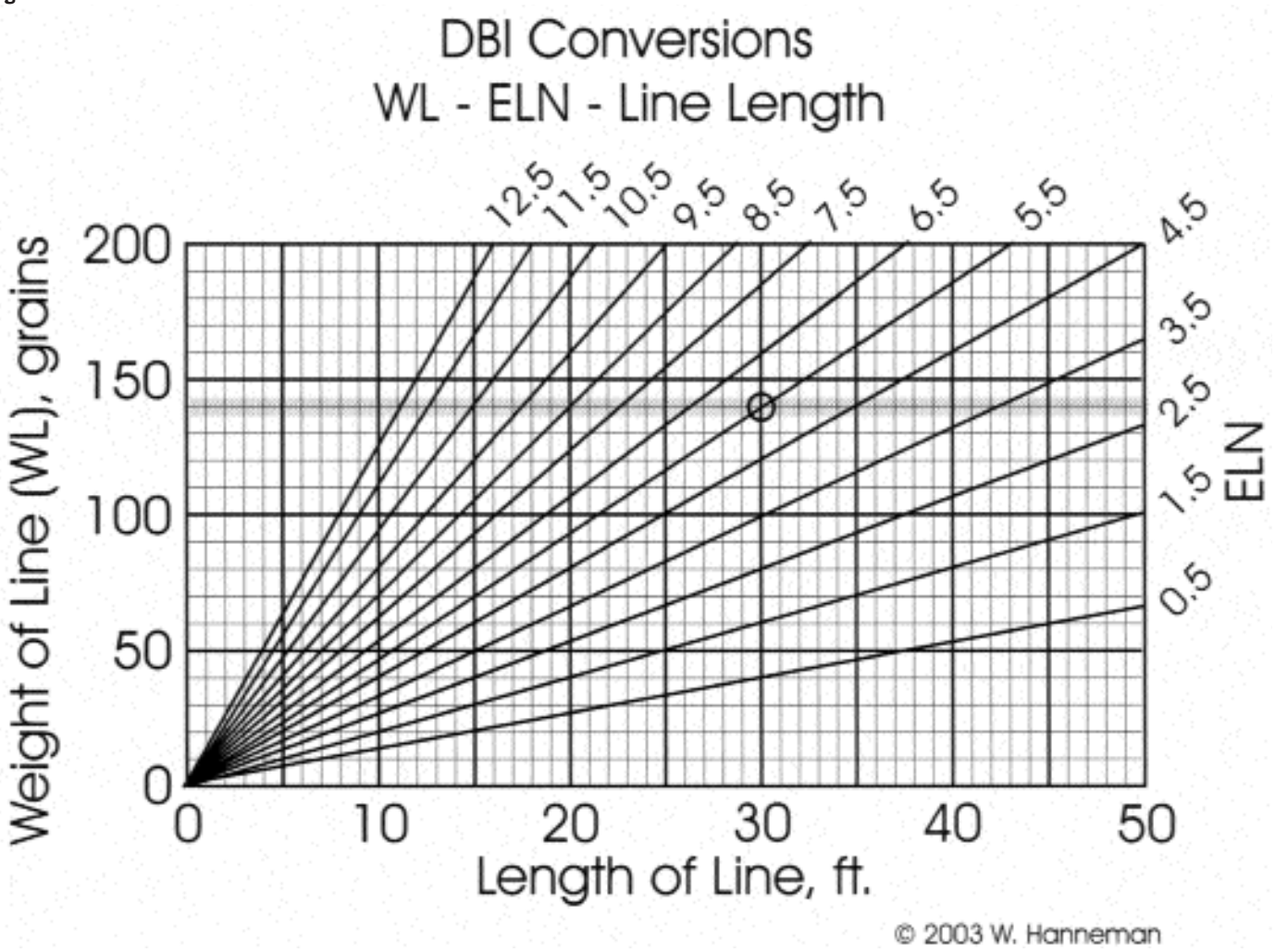
Figure 2



Sinking Lines

The preceding discussions were predicated on anglers casting in the classical manner. However, it takes but a single cast with a sinking line, a heavy fly, and/or a weighted leader to convince any angler that using the classical cast with such equipment is extremely hazardous to one's health.

Casting sinking lines invokes an entirely different form of casting. It usually incorporates a water haul to load the rod while the line is still in front of the angler. Then a slow sweeping motion of the rod creates a wide loop which eliminates the danger associated with using the classical floating line cast. As a result of this different type of cast, the rod flexes deeper towards its butt and the rod can handle a greater WL. The relationship of WL to IP based on experience is shown by the lower line in Figure 3, or you can use the formula:

Weight of Line (WL) in grains = 4.44 (number of cents) -10 e.g., WL = 4.44(66) -10 = 283 -10 = 273 grains.

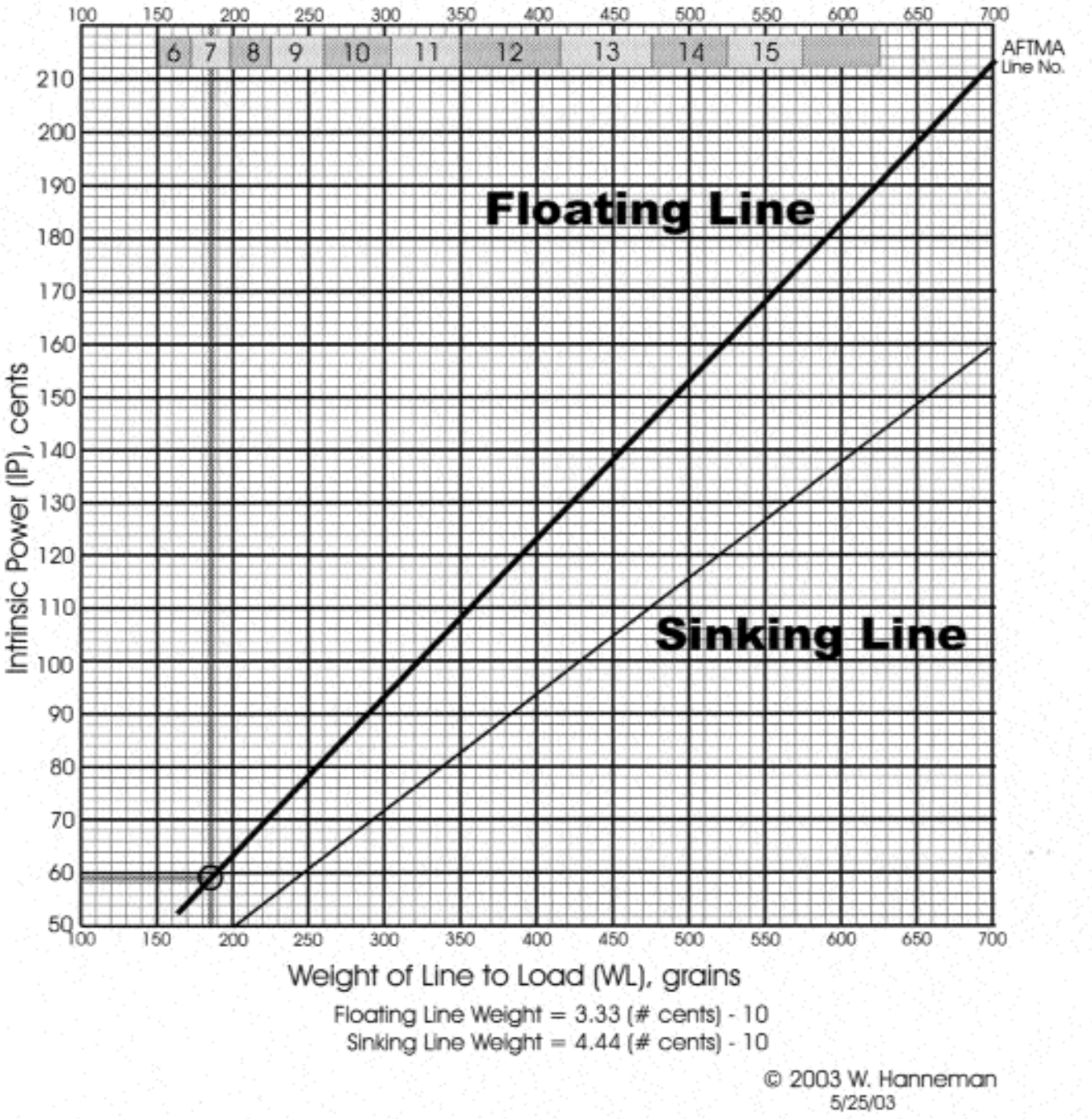
Note: Sinking lines come in a wide variety of head lengths, tapers, and sink rates. One needs an accurate means of relating aerialized line length with the weight of that length of line. For this, one needs a Fly Line Analyzer. (See Part 4.)

Warning: Be especially careful of lines described only by sink rate without any reference to line weight. There is no free lunch.

Conclusions

In order to objectively recommend the proper line for any rod you build, you must know the intrinsic power (IP) of that rod, the type of line (floating or sinking), and the length of line to be aerialized. You should also have a means of determining the weight of any length of any fly line. The charts correlating these factors have been supplied here. Instructions for making a Fly Line Analyzer are presented in Part 4.

Figure 3

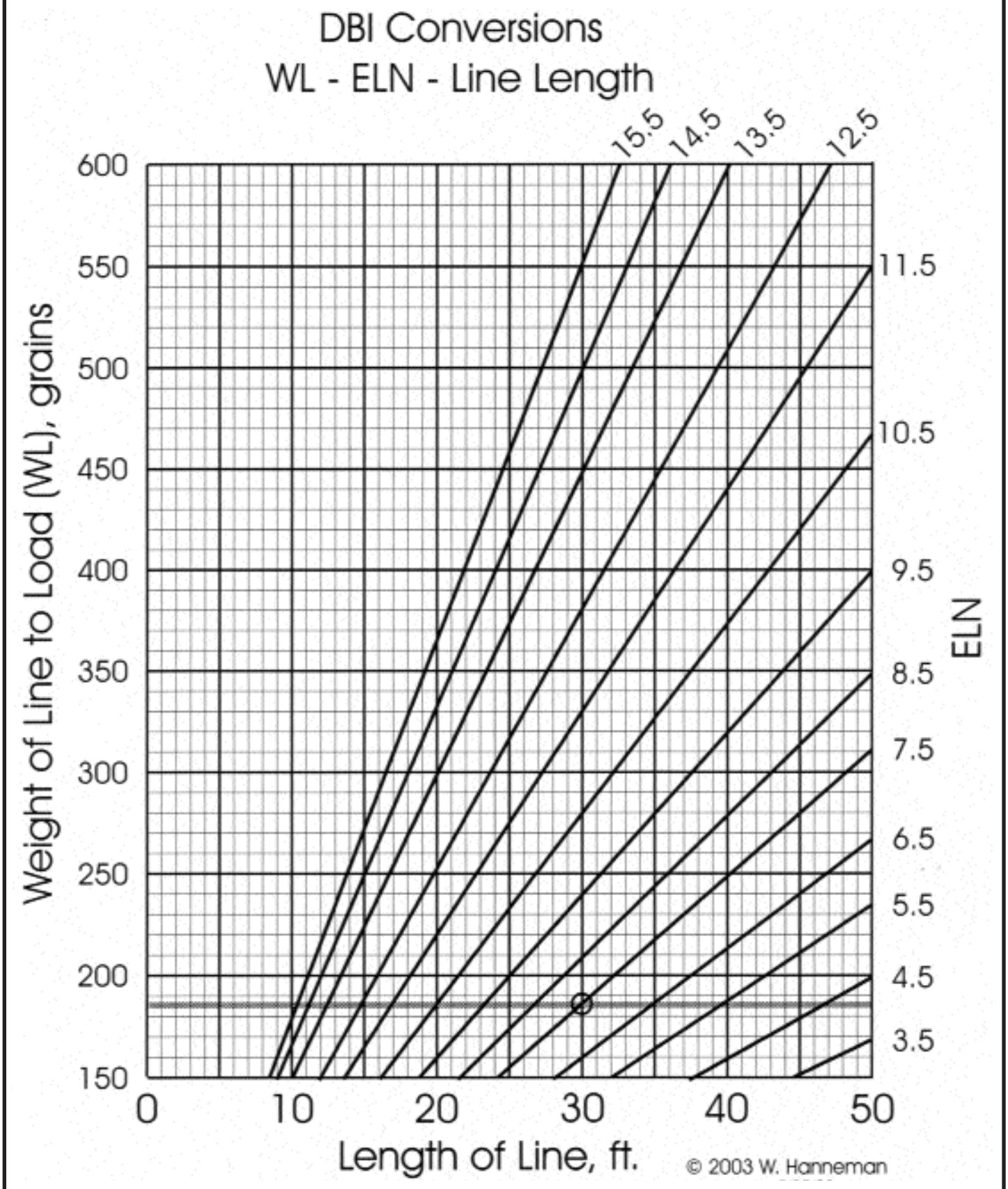


On each rod, you should inscribe the Defined Bending Index, DBI = IP / AA. While IP could be expressed as ERN, the number of cents to load, or WL - all mathematically related - I would recommend expressing IP in the form of WL, e.g., DBI=WL/AA. This would appear as DBI = 140/67 and provide the most useful information.

With each rod, you should supply appropriate copies of Figures 1-4 on which the IP of the subject rod is clearly indicated. Then, each client can determine for himself the best line for each of his future applications. Inherent in this approach will be the client's realization he needs two or more lines to cover all of his projected activities.

By using the Common Cents System, you will be doing your client a great favor. Equally as important, by replacing confusing subjective opinions with truly objective measurements, you can introduce a bit of science into the art of rod making. ✍

Figure 4


DBI Conversions
WL - ELN - Line Length
15.5
14.5
13.5
12.5
600
550
500
450
400
350
300
250
200
150
Weight of Line to Load (WL), grains
11.5
10.5
9.5
8.5
7.5
6.5
5.5
4.5
3.5
ELN
0
10
20
30
40
50
Length of Line, ft.
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