



Introduction to break-even log values (RTL)

*Matt Fonseca, October, 2008
Timber Measurements Society meeting,
Reno, Nevada*



► Break-even log values

- Also known as return-to-log (RTL): net value of a log returned to the log units of measure
- Usually based on data from mill tests applied to mill performance data and current or forecasted prices
- Used to guide the valuation of logs
 - Price paid for logs at gate or on the stump
 - Analyze different scenarios and strategies



► Drivers of RTL

Total Revenue

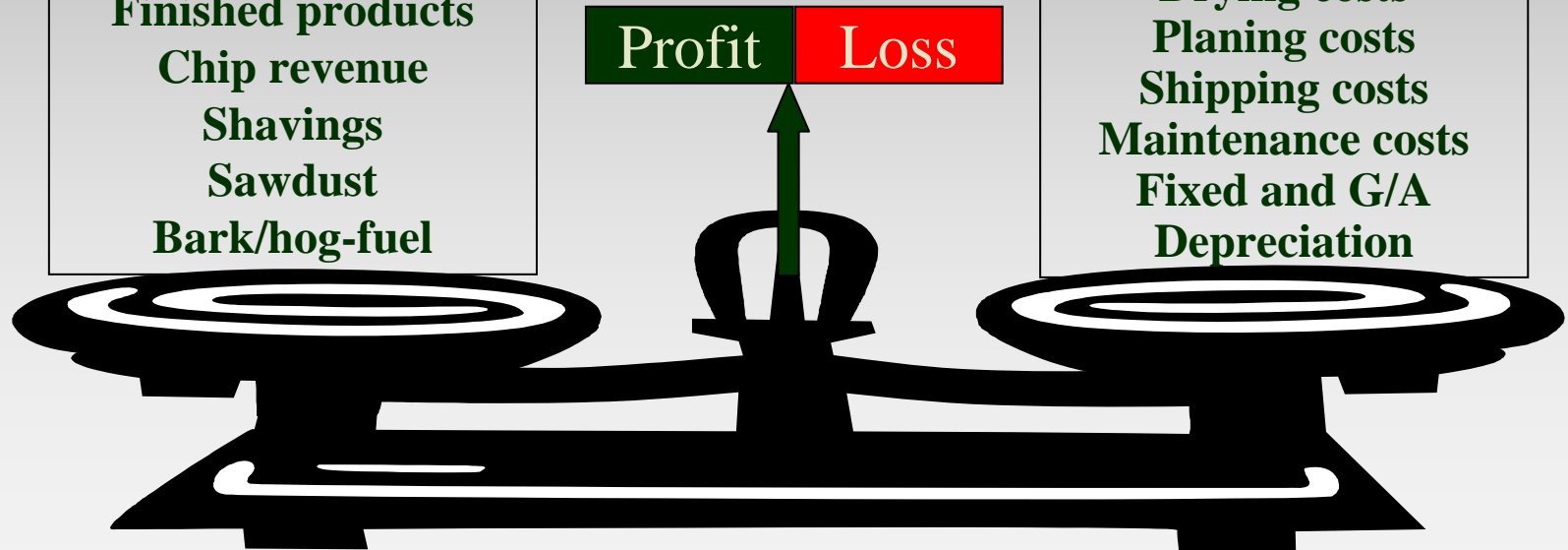
Finished products
Chip revenue
Shavings
Sawdust
Bark/hog-fuel

Profit

Loss

Total Expenses

Log cost
Log yard costs
Sawmill costs
Drying costs
Planing costs
Shipping costs
Maintenance costs
Fixed and G/A
Depreciation





► RTL Calculation basic view:

(Total revenues per unit – total manufacturing cost per unit) x recovery factor = break-even RTL

(Scribner LL example: \$320/mbf revenue – \$120/mbf manufacturing cost) x 2.4 recovery factor = \$ 480/MBF breakeven log value

or...

(Total revenues – total manufacturing cost) ÷ log volume = break-even RTL

BC m³ example: (\$320 revenue – \$120 manufacturing cost) ÷ 3.52 m³ of logs = \$ 56.80/m³ breakeven log value

Note: Revenues, manufacturing costs and recovery factor units must be in the same units (recovery factor must factor log volume into product volume for units used, e.g., mbf log to lumber volume). Revenue and costs are reflected in mbf lumber scale.



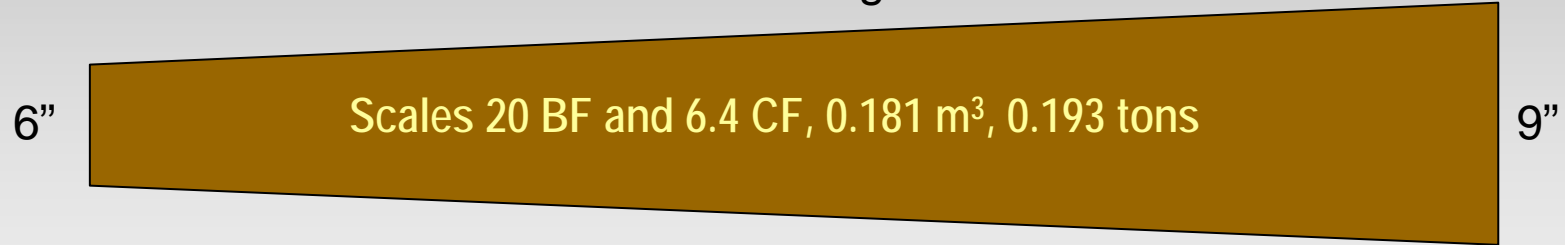
► RTL calculation closer view:

16' long



Value of \$3.11 (lumber + residuals – manufacturing cost); $RTL = \$3.11 \div .02$ mbf; or 0.027 ccf; or 0.76 m³; or 0.081 tons = \$155.50/mbf; \$115.19/ccf; \$40.92 m³; \$38.40/ton

20' long

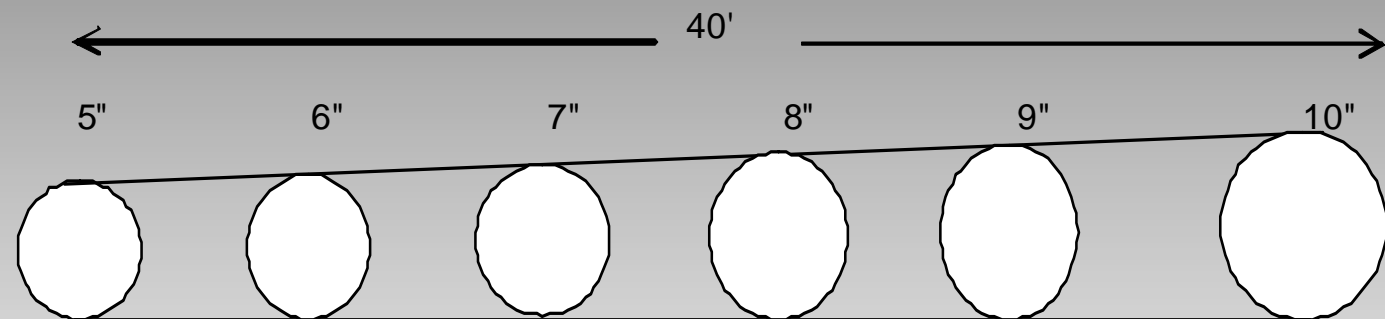


Value of \$10.58 (lumber + residuals – manufacturing cost); $RTL = \$10.58 \div .02$ mbf or 0.064 ccf or 0.181 m³ or 0.193 tons = \$529/mbf; \$165.31/ccf; \$58.45/m³; \$54.82/ton



► RTL calculation detail view:

- Block volume and Product recovery

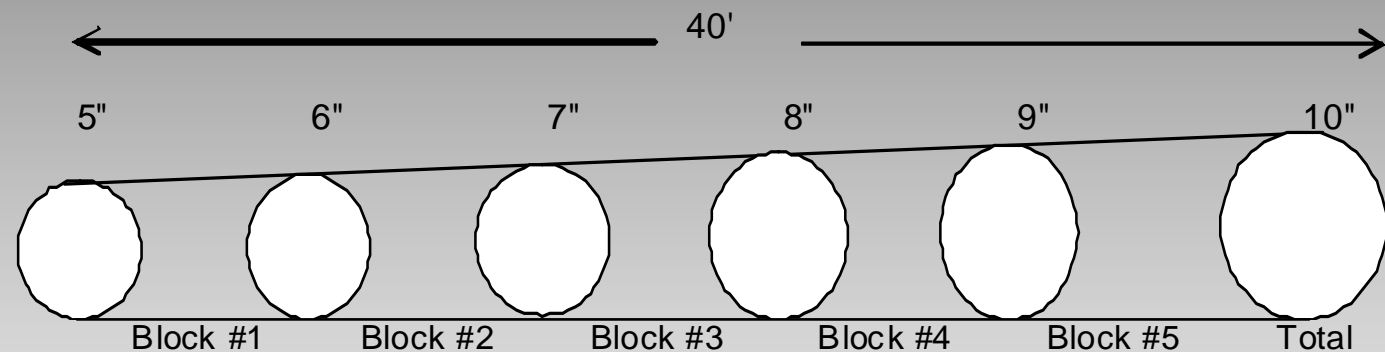


	Block #1	Block #2	Block #3	Block #4	Block #5	Total
Scribner bf	10	10	10	10	20	40
Cubic ft ³	1.3	1.9	2.5	3.2	3.9	12.8
Tons	0.042	0.058	0.078	0.100	0.124	0.40
Lumber bf	10.8	16.5	23.5	31.5	39.3	121.6
Chips BDT	0.0093	0.0114	0.0131	0.0156	0.0196	0.069
Sawdust BDT	0.0015	0.0022	0.0030	0.0039	0.0047	0.015
Shavings BDT	0.0014	0.0022	0.0030	0.0040	0.0050	0.016
Bark (saleable) BDT	0.00126	0.00174	0.00233	0.00299	0.00372	0.0120



► RTL Calculation detail:

- Product unit prices and by log block

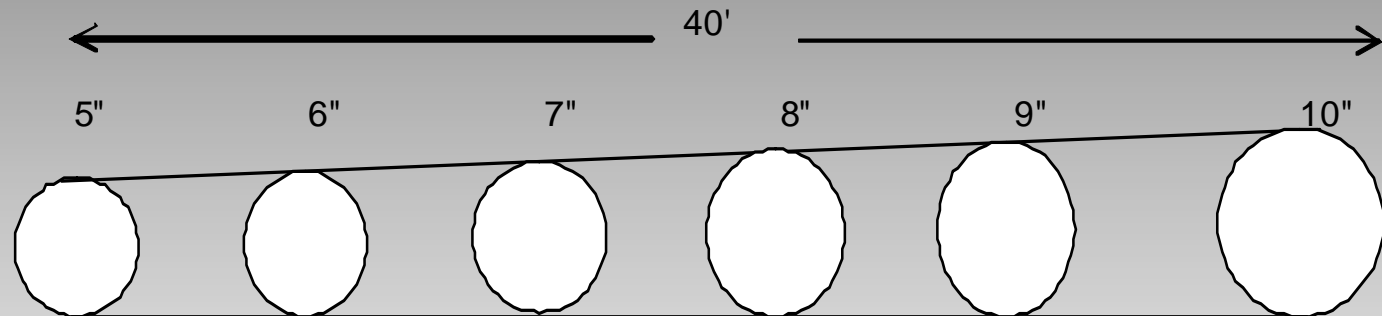


	Block #1	Block #2	Block #3	Block #4	Block #5	Total
Lumber \$/mbf	\$ 221.00	\$ 237.00	\$ 251.00	\$ 263.00	\$ 257.00	\$ 251.49
Chips \$/BDT	\$ 89.00	\$ 89.00	\$ 89.00	\$ 89.00	\$ 89.00	\$ 89.00
Sawdust \$/BDT	\$ 61.00	\$ 61.00	\$ 61.00	\$ 61.00	\$ 61.00	\$ 49.00
Shavings \$/BDT	\$ 74.00	\$ 74.00	\$ 74.00	\$ 74.00	\$ 74.00	\$ 74.00
Bark \$/BDT	\$ 32.00	\$ 32.00	\$ 32.00	\$ 32.00	\$ 32.00	\$ 32.00
Lumber \$	\$ 2.38	\$ 3.91	\$ 5.91	\$ 8.28	\$ 10.10	\$ 30.57
Chips \$	\$ 0.83	\$ 1.02	\$ 1.17	\$ 1.39	\$ 1.74	\$ 6.15
Sawdust \$	\$ 0.09	\$ 0.13	\$ 0.18	\$ 0.24	\$ 0.29	\$ 0.93
Shavings \$	\$ 0.11	\$ 0.16	\$ 0.22	\$ 0.30	\$ 0.37	\$ 1.16
Bark \$	\$ 0.04	\$ 0.06	\$ 0.07	\$ 0.10	\$ 0.12	\$ 0.38
Total block value \$	\$ 3.45	\$ 5.28	\$ 7.55	\$ 10.29	\$ 12.62	\$ 39.18



► RTL Calculation detail:

- Manufacturing costs

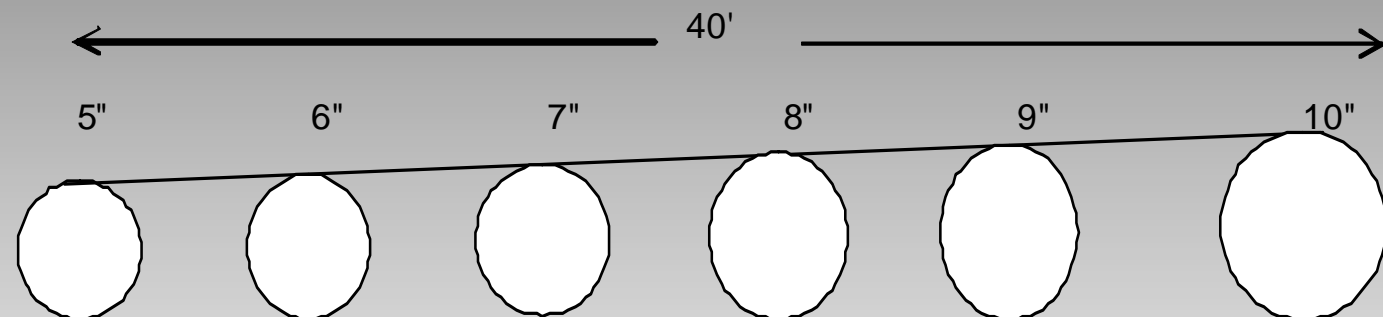


	Block #1	Block #2	Block #3	Block #4	Block #5	Total
Man. \$/mbf lum.	\$ 225.53	\$ 158.04	\$ 125.30	\$ 106.29	\$ 94.39	\$ 123.72
Man.\$ by block	\$ 2.43	\$ 2.60	\$ 2.95	\$ 3.35	\$ 3.71	\$ 15.04



► RTL Calculation close-up:

- Breakeven log value (RTL)



	Block #1	Block #2	Block #3	Block #4	Block #5	Total
Total block value \$	\$ 3.45	\$ 5.28	\$ 7.55	\$ 10.29	\$ 12.62	\$ 39.18
Man.\$ by block	\$ 2.43	\$ 2.60	\$ 2.95	\$ 3.35	\$ 3.71	\$ 15.04
Net log value \$	\$ 1.01	\$ 2.67	\$ 4.60	\$ 6.95	\$ 8.91	\$ 24.14

RTL/mbf	\$ 101.30	\$ 267.10	\$ 460.28	\$ 694.86	\$ 445.46	\$ 603.62
RTL/ccf	\$ 76.12	\$ 144.04	\$ 186.71	\$ 219.66	\$ 225.63	\$ 189.19
RTL/m ³	\$ 23.93	\$ 45.27	\$ 58.68	\$ 69.04	\$ 70.91	\$ 59.46
RTL/Ton	\$ 24.12	\$ 46.05	\$ 59.39	\$ 69.83	\$ 71.85	\$ 60.21

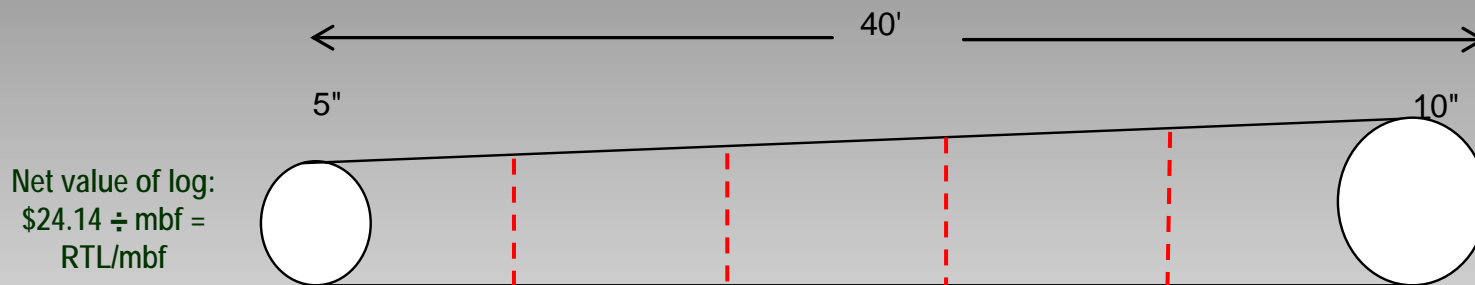


Block #1 might be worth more as chips, given the assumptions used (will investigate further)



▶ RTL Calculation close-up:

- Breakeven log value (RTL)



- ▶ $40' - 5'' = 40 \text{ BF @ } \$603.62/\text{mbf}$
- ▶ $8' - 5'' = 10 \text{ BF @ } \$101.30/\text{mbf}$; $32' - 6'' = 50 \text{ BF @ } \$462.63/\text{mbf}$; Total = 60 BF @ \$402.41/mbf
- ▶ $16' - 5'' = 20 \text{ BF @ } \$184.20/\text{mbf}$; $24' - 7'' = 40 \text{ BF @ } \$511.52/\text{mbf}$; Total = 60 BF @ \$402.41/mbf
- ▶ $24' - 5'' = 20 \text{ BF @ } \$276.23/\text{mbf}$; $16' - 8'' = 30 \text{ BF @ } \$528.59/\text{mbf}$; Total = 50 BF @ \$482.89/mbf
- ▶ $32' - 5'' = 30 \text{ BF @ } \$507.85/\text{mbf}$; $8' - 9'' = 20 \text{ BF @ } \$445.46/\text{mbf}$; Total = 50 BF @ \$482.89/mbf



► RTL Calculation close-up:

- Breakeven log value (chipping block #1)

Block #1	
Scribner bf	10
Cubic ft ³	1.3
Tons	0.042
Chips BDT	0.0197
Bark (saleable) BDT	0.00126
Chips \$/BDT	\$ 89.00
Bark \$/BDT	\$ 32.00

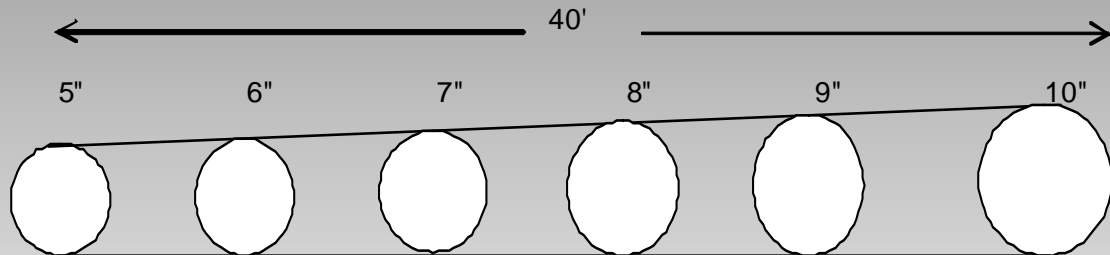
Chips \$	\$ 1.75
Bark \$	\$ 0.04
Total block value \$	\$ 1.79

Man. \$/bdt	\$ 12.20
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Man.\$ by block	\$ 0.24
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Net log value \$	\$ 1.55
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RTL/mbf	\$ 155.18
RTL/ccf	\$ 116.61
RTL/m ³	\$ 36.65
RTL/Ton	\$ 36.95

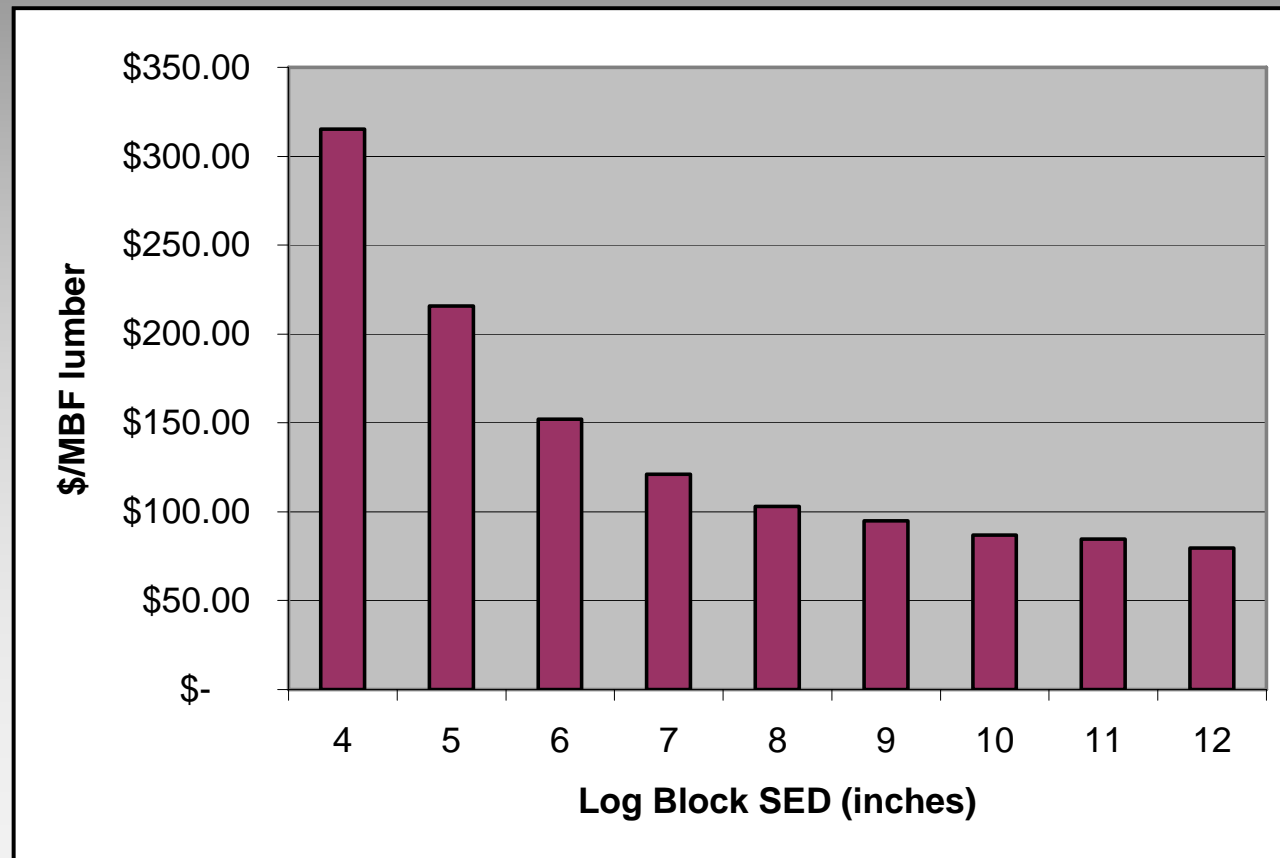


Sawing scenario = \$1.01; 55% improvement to chip



► Modeling manufacturing costs

Manufacturing cost distribution by block diameter at a stud mill (example)





► Modeling manufacturing costs

► Simplified example:

- Mill averages 1,000 blocks and 23.5 mbf/hour giving a manufacturing cost of \$80/mbf lumber green-end
- At *1,000 blocks/hr for 5", green-end costs would = \$174/mbf, e.g. $23,500 \div 10,800 \times \$80 = \$174$
- ** Assumed non-size sensitive finished-end costs = \$40/mbf, so 5" = \$214/mbf; average = \$120/mbf

* This rate may change by log diameter and blocks per hour may be limited by secondary breakdown equipment such as edgers, gang-saws, re-saws and trimmers.

**As larger diameter logs generally produce wider products, this will not be the case in processes that are constrained by lug capacity or lineal feed rates such as planing.



- ▶ In general, manufacturing costs decrease as diameter increases
- ▶ This occurs because:
 - ▶ Much of the manufacturing process is constrained by lineal feed rates, e.g., an 8" log will go through the primary breakdown of a sawmill at the same speed as a 5" log yet yield more than 3 times the lumber.
 - ▶ Related to the above, some manufacturing processes are constrained by the number of pieces which can be processed over a given period, e.g., charging the lathe in a plywood plant or loading a sharp-chain, and sorting logs in a log yard.



► Modeling product values

- Width and grade matrix from mill studies

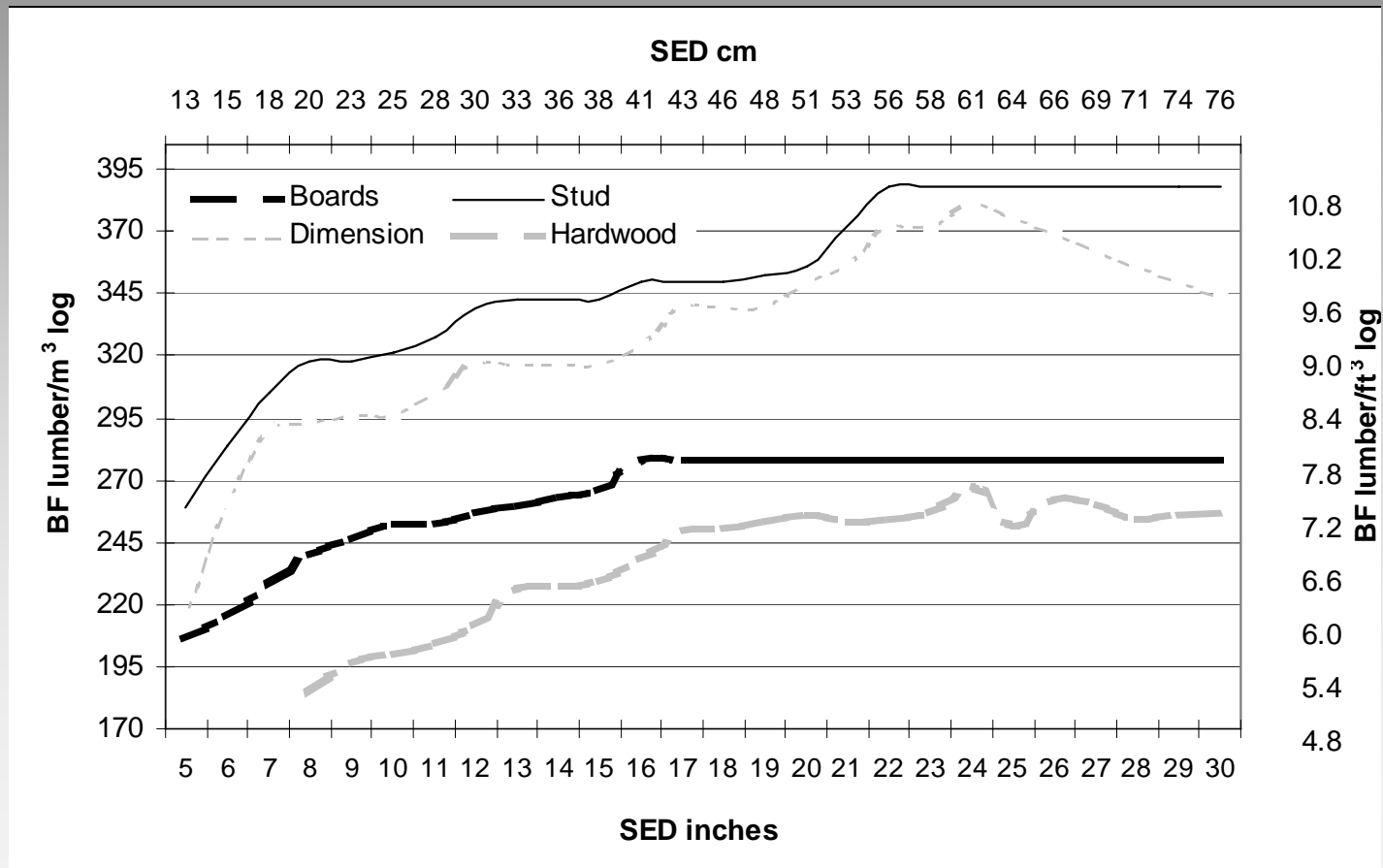
	bms	cbtr	cbtre	#1	#2	c_3btr	#3	c_3rurb	#4	dss	ind	nr	prime	ripex	rips4s	Total
19 1.00 X 4.00		0.6%			0.5%		0.3%		0.3%							1.7%
19 1.00 X 6.00		0.7%			0.2%		0.2%									1.1%
19 1.00 X 8.00					0.2%											0.2%
19 2.00 X 4.00				0.2%												0.2%
19 2.00 X 6.00	0.1%		0.5%	0.8%	2.0%									0.5%		3.8%
19 2.00 X 8.00		0.7%	0.6%	0.9%	6.4%				0.2%							8.9%
19 2.00 X 10.00			1.6%	1.9%	2.6%	0.3%	2.0%		3.4%				0.9%	1.2%		14.0%
19 2.00 X 12.00	1.3%		0.6%	6.7%	39.9%	0.9%	3.9%		5.6%	1.9%	1.3%		7.9%			70.0%
Total 19" Dia.	1.4%	2.0%	3.2%	10.6%	51.8%	1.2%	6.5%		9.6%	1.9%	1.3%		8.8%	1.7%		100.0%

20 1.00 X 4.00		0.8%		0.2%	0.5%		0.2%									1.8%
20 1.00 X 6.00		0.5%		0.8%	0.7%		0.3%		0.3%							2.6%
20 1.00 X 8.00																
20 2.00 X 4.00					0.4%											0.4%
20 2.00 X 6.00					1.7%					0.9%						2.6%
20 2.00 X 8.00			1.2%	1.6%	6.9%		0.7%		0.7%						0.9%	12.0%
20 2.00 X 10.00	0.4%		4.8%		6.2%											11.4%
20 2.00 X 12.00	2.1%		11.1%	6.1%	40.4%		1.6%		2.4%	1.6%	1.8%	0.8%		1.3%		69.2%
Total 20" Dia.	2.5%	1.4%	17.2%	8.7%	56.7%		2.8%		3.3%	2.5%	1.8%	0.8%		1.3%	0.9%	100.0%



► Modeling product recovery

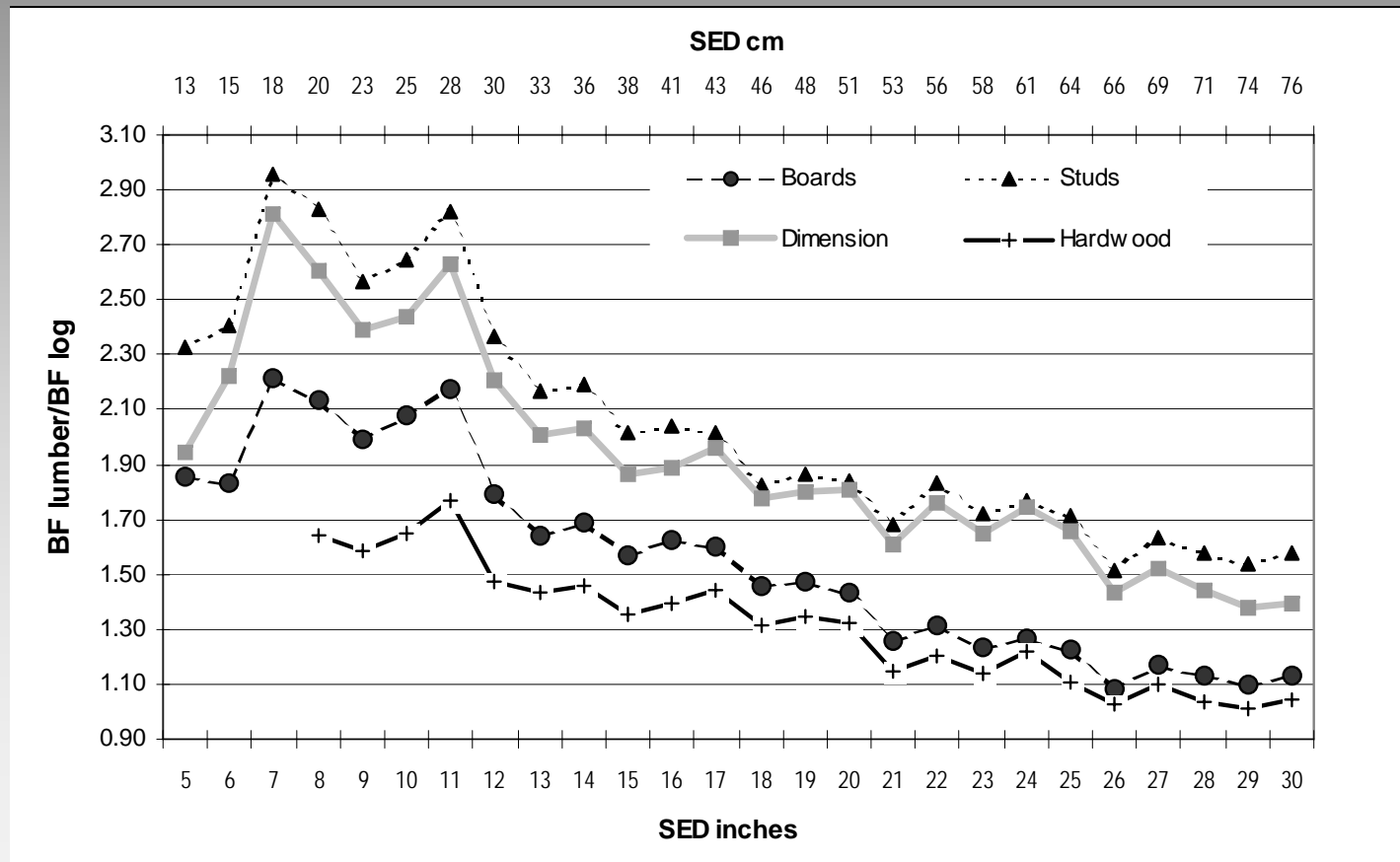
Lumber recovery by small-end diameter of log and mill type, actual log volume (B.C. Firmwood)
(*LRF*)





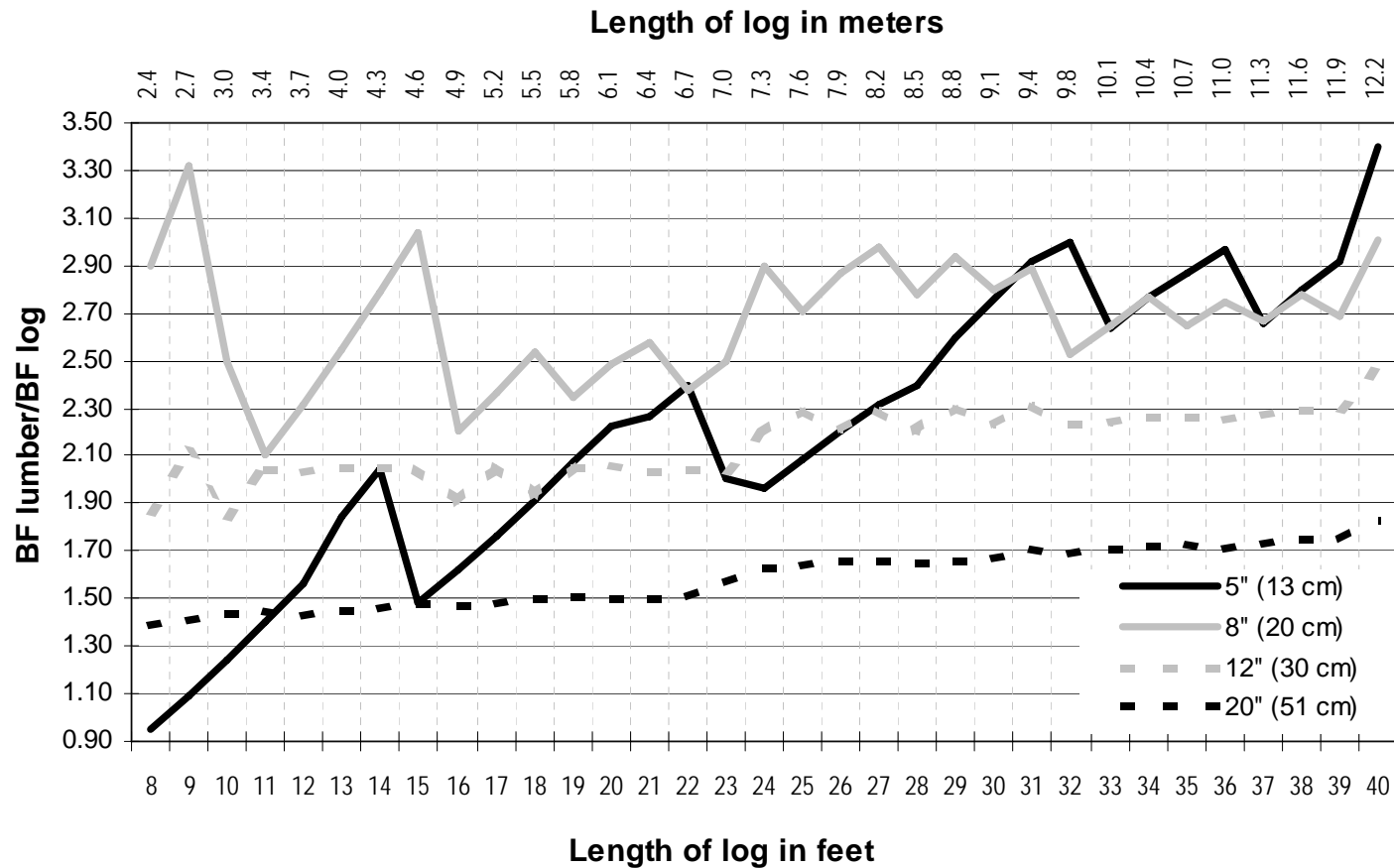
► Modeling product recovery

Scribner Long Log Rule recovery by lumber product and log diameter





► Modeling product recovery





► RTL: Key points

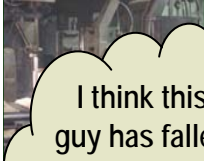
- In general value increases with diameter (higher recovery + lower manufacturing costs = more \$)
- In most cases more valuable products are obtained from bigger diameters, thus adding to the above
- There is tremendous variability in value caused by Scribner log scale
- Logs are often purchased on Scribner and generally at one price-point per log grade (stud or peeler) making it difficult to control margins when diameter and log lengths change
- To truly understand log value, cubic scale is the only way to go – even if you have to purchase on mbf



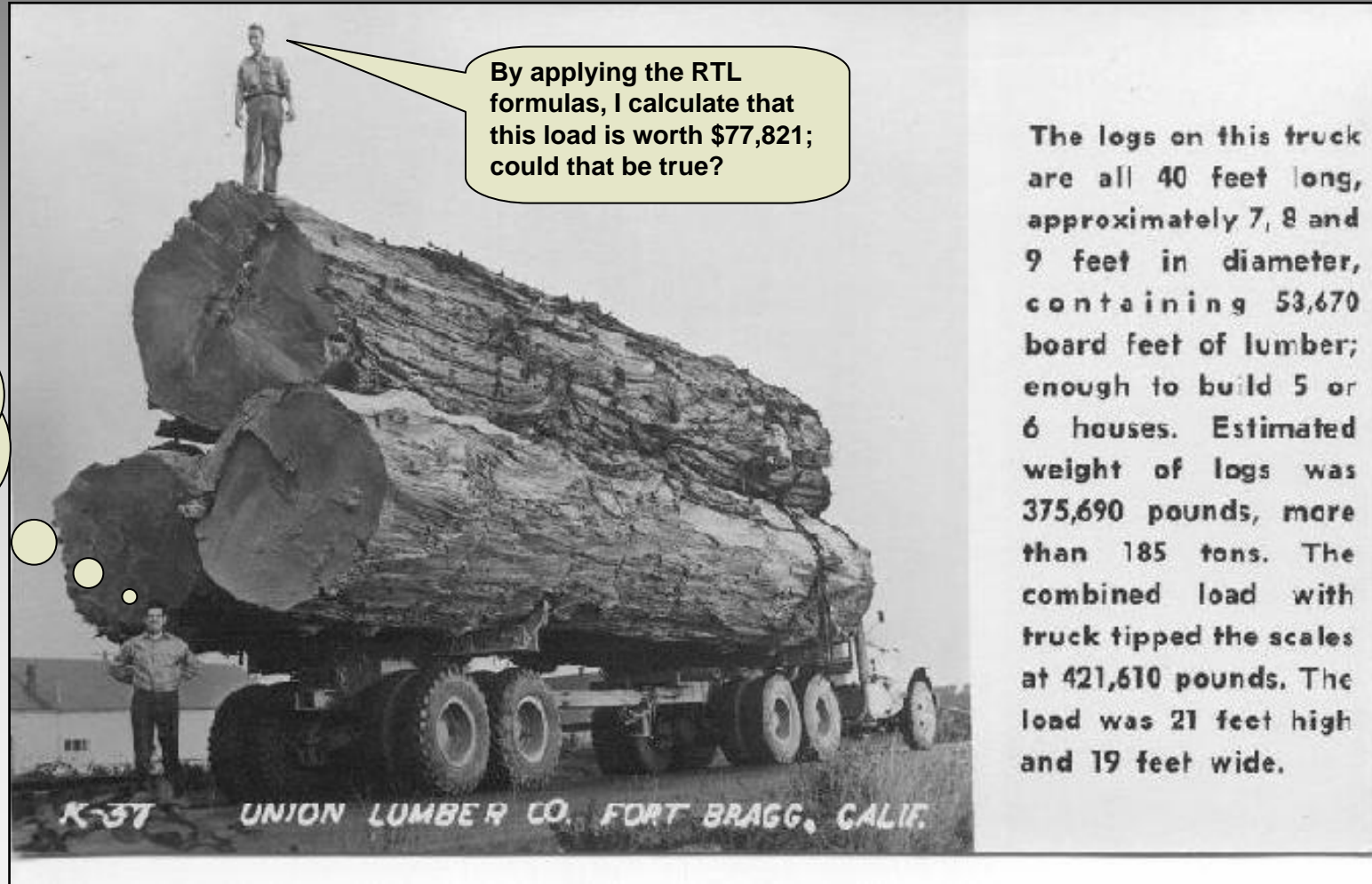
▶ RTL: Example of report

Southern yellow pine dimension mill example

Lumber Sales Average (MBF Lumber)	6"	7-8"	9-10"S	9-10"M	9-10"R	11-12"S	11-12"M	11-12"R	13-15"S	13-15"M	13-15"R	16"+S	16"+M	16"+R
	\$ 268.61	\$ 270.11	\$ 341.41	\$ 312.26	\$ 281.71	\$ 381.59	\$ 340.93	\$ 298.78	\$ 413.02	\$ 384.12	\$ 334.37	\$ 439.71	\$ 440.34	\$ 388.74
Residuals (MBF Lumber)														
Chips	\$ 35.78	\$ 33.12	\$ 33.12	\$ 30.76	\$ 31.01	\$ 30.41	\$ 30.01	\$ 28.66	\$ 28.26	\$ 28.14	\$ 28.11	\$ 27.97	\$ 27.97	\$ 27.97
Other	\$ 6.50	\$ 6.50	\$ 6.50	\$ 6.50	\$ 6.50	\$ 6.50	\$ 6.50	\$ 6.50	\$ 6.50	\$ 6.50	\$ 6.50	\$ 6.50	\$ 6.50	\$ 6.50
Total Revenue (MBF Lumber)	\$ 310.89	\$ 309.74	\$ 381.04	\$ 349.52	\$ 319.22	\$ 418.50	\$ 377.43	\$ 333.93	\$ 447.78	\$ 418.76	\$ 368.99	\$ 474.17	\$ 474.81	\$ 423.20
Costs (MBF Lumber)														
Green End	\$ 149.95	\$ 114.61	\$ 90.12	\$ 90.74	\$ 90.30	\$ 80.81	\$ 80.70	\$ 79.89	\$ 73.70	\$ 74.20	\$ 73.25	\$ 69.13	\$ 69.04	\$ 69.08
Dry End	\$ 29.23	\$ 27.11	\$ 20.76	\$ 21.98	\$ 22.51	\$ 17.85	\$ 18.44	\$ 18.61	\$ 16.42	\$ 16.27	\$ 16.86	\$ 15.98	\$ 15.96	\$ 16.17
D.D.A.	\$ 24.20	\$ 24.20	\$ 24.20	\$ 24.20	\$ 24.20	\$ 24.20	\$ 24.20	\$ 24.20	\$ 24.20	\$ 24.20	\$ 24.20	\$ 24.20	\$ 24.20	\$ 24.20
Total Costs	\$ 203.37	\$ 165.92	\$ 135.08	\$ 136.92	\$ 137.01	\$ 122.86	\$ 123.34	\$ 122.70	\$ 114.32	\$ 114.67	\$ 114.31	\$ 109.30	\$ 109.20	\$ 109.45
LRF	7.480	8.080	8.080	8.700	8.630	8.800	8.920	9.340	9.470	9.510	9.520	9.570	9.570	9.570
CCF/MBF Log	7.99	4.38	2.64	2.78	2.96	2.25	2.22	2.34	1.87	1.92	1.97	1.63	1.65	1.73
Cash RTL														
MBF Doyle	\$ 787.24	\$ 594.62	\$ 576.27	\$ 572.74	\$ 527.28	\$ 633.30	\$ 551.09	\$ 514.56	\$ 633.37	\$ 599.43	\$ 523.02	\$ 606.92	\$ 615.53	\$ 559.53
CCF	\$ 98.53	\$ 135.76	\$ 218.29	\$ 206.02	\$ 178.14	\$ 281.47	\$ 248.24	\$ 219.90	\$ 338.70	\$ 312.20	\$ 265.49	\$ 372.34	\$ 373.05	\$ 323.43
Ton	\$ 26.99	\$ 37.19	\$ 59.80	\$ 56.44	\$ 48.80	\$ 77.11	\$ 68.01	\$ 60.25	\$ 92.79	\$ 85.53	\$ 72.74	\$ 102.01	\$ 102.20	\$ 88.61
RTL W / D.D.A.														
MBF Doyle	\$ 642.60	\$ 508.98	\$ 524.65	\$ 514.21	\$ 465.46	\$ 585.38	\$ 503.17	\$ 461.67	\$ 590.51	\$ 555.24	\$ 477.63	\$ 569.17	\$ 577.32	\$ 519.46
CCF	\$ 80.43	\$ 116.20	\$ 198.73	\$ 184.97	\$ 157.25	\$ 260.17	\$ 226.65	\$ 197.29	\$ 315.78	\$ 289.19	\$ 242.45	\$ 349.18	\$ 349.89	\$ 300.27
Ton	\$ 22.03	\$ 31.84	\$ 54.45	\$ 50.68	\$ 43.08	\$ 71.28	\$ 62.10	\$ 54.05	\$ 86.52	\$ 79.23	\$ 66.43	\$ 95.67	\$ 95.86	\$ 82.26



Thank you for your attention Any Questions?



By applying the RTL formulas, I calculate that this load is worth \$77,821; could that be true?

The logs on this truck are all 40 feet long, approximately 7, 8 and 9 feet in diameter, containing 53,670 board feet of lumber; enough to build 5 or 6 houses. Estimated weight of logs was 375,690 pounds, more than 185 tons. The combined load with truck tipped the scales at 421,610 pounds. The load was 21 feet high and 19 feet wide.

I think this guy has fallen on his head a few times!

K-37 UNION LUMBER CO. FORT BRAGG, CALIF.