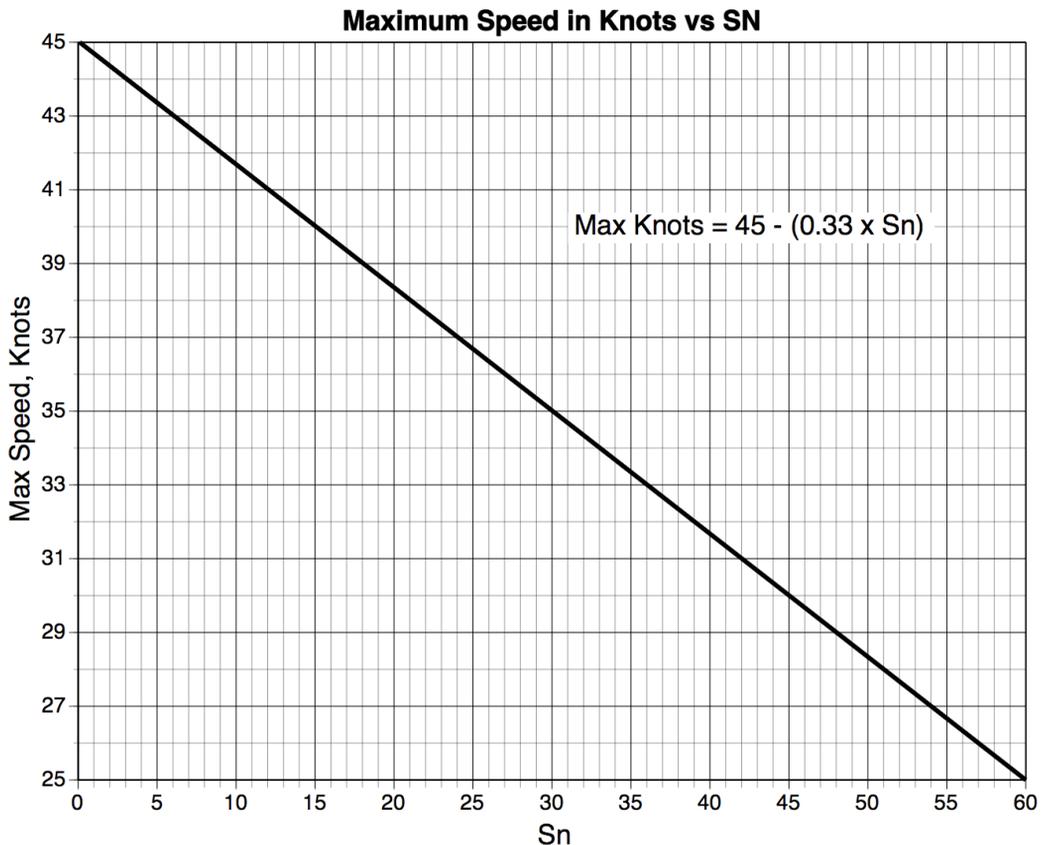


Boat Strength Errata & Updates

7/7/18 – Sheet 1 of 5

Formulas 1-2 and 1-3, page 7: Instead of averaging LOA and LWL and when LOA is more than 108% and instead of averaging BOA and BWL when BOA is over 112%, **always** average both for all boats. Note that for boats over 30 feet the difference will not usually be significant, but for small boats it can make a difference.

Types of Vessels Covered by The Elements of Boat Strength's Scantling Rules, page 8: Change vessels with a maximum speed of 45 knots, to vessels who's speed is no higher than the (new added) **Formula 1-4**, Maximum Speed, knots $\leq 45 - (0.33 \times S_n)$.



Page 19 Correction, Beginning of second paragraph should read: Form most vessels more than 25 to 30 feet (7.5 to 9 m), the skin coat is from 1- to 1-1/2 oz./sq.**ft.** (Changed word in bold underline.)

Table 4.9, page 33: "Roving Weight Thickness" should read "Roving Weight vs. Thickness."

Deck-Hardware Areas, page 35, third line: Should read "and around the mast **partners** by 1.25 times." (Changed word in bold.)

Formula 4-17, page 39: Last sentence should read: . . . be a minimum thickness of **0.09** and **0.1** inch (**2.28** and **2.54** mm) thick respectively.

Formula 5-1, page 40: Add the following at the end of the current text in the box: On large or wide boats more bottom stringers may be required. Bottom stringers are not to be spaced more than:

$$\%WL \text{ Beam} = 0.24 \div Sn^{0.12} \text{ O.C. (on center)}$$

Where:

%WL Beam = The percent of waterline beam

For boats with less than 5% deadrise an additional bottom stringer should be installed on the centerline as a CVK (centerline vertical keel).

Formula 5-1, page 40: At the end of the text in the box, add: (See Formula 5-3)

Formula 5-3, page 43: Change last paragraph in the formula box to read: "Deck Stringer Spacing: no greater than 32 inches, stringer core edge to core edge, or 75 times deck thickness, whichever is less."

ADD

Pages 45-47 - Note on Cored Bulkheads:

This formula is intended for use only with commercially available cored panels, such as Baltek's Decolite. These panels come in standard thicknesses up to 1 inch (25.4 mm), and are faced with a laminate of 0°/90° 1208 on both sides. This is the laminate intended for this formula and the maximum cored-bulkhead thickness covered in this formula is 1 inch (25.4 mm). If thicker is required, use solid-ply bulkheads.

Formula 5-7, page 48. There is no error here, but the floors from this formula are larger and stronger than really needed. Should be changed to minimum floor height as 2.1 x wood core thickness rather than 2.5 times as in the current formula. (This changes the worked examples.)

Formula 5-8, page 50. There is no error here, but the floors from this formula are larger and stronger than really needed. Should be changed to minimum floor height as 2.25 x wood core thickness rather than 3 times as in the current formula. (This changes the worked examples.)

ADD

Floors - Additional Note On Dimensions:

The floor height from formulas 5-7 and 5-8 are the maximum height at the keel, at the boat centerline. The floors are usually straight across their top at the center, so the height gets lower as the boat hull rises on either side. Note that if the hull rises rather steeply then the floor will have to be flat across the top and then bend up in a sort of V or U shape to achieve the width across the hull recommended by the rule. The height (molding) of the "arms" of the V or U on the hull sides can be no less than 1 times the core thickness, either tapering away to nothing at their outer ends or ending at a longitudinal.

ADD

Floors – Method of Reducing Floor Height:

If necessary for interior space considerations, the floors may be reduced in height by increasing thickness by 1.1 times the percent reduction in height, but floor height must never be less than 1.25 times the original calculated floor thickness, For instance, the example-boat's floor cores were 4.3 in. thick and 10.75 in. high (109 x 273 mm). To reduce to 8 inches (200 mm) high:

$$10.75 \text{ in.} - 8 \text{ in.} = 2.75 \text{ in.}, 2.75 \text{ in.} \div 10.75 \text{ in.} = 0.258, 0.258 \times 1.1 = 0.28 \text{ so:}$$
$$1.28 \times 4.3 \text{ in. original core thickness} = 5.5 \text{ in. core thickness}$$

or

$$273 \text{ mm} - 200 \text{ mm} = 73 \text{ mm}, 73 \text{ mm} \div 273 \text{ mm} = 0.266, 0.266 \times 1.1 = 0.29 \text{ so:}$$
$$1.29 \times 109 \text{ mm original core thickness} = 140.6, \text{ use } 140 \text{ mm core thickness}$$

ADD

Floors in the Ends of the Boat:

The floor heights from formulas 5-7 and 5-8 are for the largest floors in the middle third of the boat. As you move farther to the ends of the boat, the floors can be reduced gradually in height as needed (without increasing floor thickness), but to no less than 60% of the maximum floor height in the middle third of the vessel. Floors are not required in fiberglass boats in the forward 18% or after 25% of the hull.

Page 52 Insert: First sentence of first paragraph, 2nd column should be changed to read: "NOTE: The mast step (**see 9-30 and 16-12A**) should land on," (Addition in bold.)

Formula 5-15, page 59: After "Use whichever is larger." Add "The engine-mount bolt diameter should never be less than 3/8 in. or 9.5 mm."

Page 65 Change: 2nd column. Change paragraph to read: "Solid-Glass Keel and Stem (see formula 6-10: 0.71-in. thick – 0.42 in. sandwich hull-bottom FRP laminate = 0.29 in., and 0.29 in. ÷ 0.089 in./ply (24-15 combi-mat) = 3.26 layers.

Table 6-19, page 77: Heading of the left column should read, "Density, lb/cu. ft. (kg/m³)."
Heading of the right column should read, "lb./sq.ft. (kg/m²), 1-in. (1 mm) thick."

Formula 9-4, page 112: This should read:

Frames can be spaced farther apart or closer together, as convenient, by increasing or decreasing frame siding and molding 3.2 percent for each inch **or 0.125 percent for each millimeter** of increase or decrease in frame spacing. (This would require changing the worked examples for metric.)

Formula 9-21, page 124:

This formula doesn't address the spacing of deck beams in single-sawn frame on hard-chine boats, which (per Formula 9-3) are spaced 2.5 times farther apart than bent frame spacing. Decks and framing for such boats should be as follows:

Deck beams at approximately the usual spacing for round-bilge boats, with the intermediate beams landing on and fastened to a strong shelf and clamp. Alternately, use widely-spaced deck beams (attached to each widely spaced frame) and use plywood decks but of the same thickness as a plank-on-frame deck (not reduced in thickness for plywood). Then, install deck longitudinals notched into the top of the deck beam. These deck longitudinals should be molded and sided half the deck-beam molding. They are to be located so no deck panel is more than 18 inches (458 mm) wide.

Formula 9-33, page 134:

This formula should refer to Formula 5-15.

Formula 10-4, pages 142-3: This should read:

Butt-Block Width (Fore-n-Aft) = 1.2 x plank height at the butt block

Formula 11-3, pages 157-8: The exponent should be 0.37, not 0.3 as shown. (This same typographical error is in the worked examples, but the numbers in the examples are otherwise correct.)

Page 187 Correction: 2nd column, end of paragraph under ADVANTAGES OF ALUMINUM, the last sentence should be changed to read: "(see drawing on page 193.)"

Page 198 Correct Caption: The caption on the photo at the bottom of this page should be changed to read: “*Magic Moment*, built by Kanter Yachts. This Gerr-designed 52-foot (15.8 m) aluminum ketch, has cruised over 40,000 miles, serving as its owners’ permanent home.”

Formula 15-A1, page 225: The exponent should be 0.21, not 0.2 as shown. (This error does not appear in the worked examples, which are OK.)

Formula 15-3, page 228: This should read:

Aluminum: Transom thickness **on outboard and sterndrive boats** = bottom plate + 1/8” or bottom plate +3.2 mm. Transom plate on other boats = same as topsides plate. (Added words in bold.)

Steel: Transom thickness **on outboard and sterndrive boats** = bottom plate + 1/16” or bottom plate +1.6 mm. Transom plate on other boats = same as topsides plate. (Added words in bold.)

Page 231 Correction: 1st column, 1st paragraph, change (12.7 m) to (12.7 mm)

Page 233, Bottom Longitudinal O.C. Spacing Adjustment For Speed, should read:

Decrease bottom longitudinal O.C. spacing—up to the BLH (or chine) (see Formula 4-3)—by 1 percent for every knot over **25** knots, not 20 knots as shown. (This is correct in the worked examples.)

Page 236 Correction: 2nd column metric example near top, change Height, in. = 35 – 20 = 15; therefore to: Height, **mm** = 35 – 20 = 15; therefore to: (Correction in bold.)

Formula 15-15, page 249: This should read:

Floor Thickness = same as bottom frame webs. (This is not incorrect as worded, but seems to indicate that the floor webs get thicker with higher speeds, which they don’t.)

Formula 15-17A, page 251: The exponent should be 0.47, not 0.4 as shown. (This same typographical error is in the worked examples, but the numbers in the examples are otherwise correct.)

Page 271, 2 Corrections:

(1) last sentence in formula 16-16A box, should read, “round up all decimals 0.5 and higher)”

(2) 2nd column, last paragraph, change (2224 kW) to (224 kW)

Formula 16-7A, page 274: Add at the end of the text in the box ending on page 275: On large or wide boats more hull-bottom girders may be required. Bottom stringers are not to be spaced more than:

$$\%WL \text{ Beam} = 0.24 \div S_n^{0.12} \text{ O.C. (on center)}$$

Where:

%WL Beam = The percent of waterline beam

Formula 16-7S, page 276: Add at the end of the text in the box: On large or wide boats more hull bottom girders may be required. Bottom stringers are not to be spaced more than:

$$\%WL \text{ Beam} = 0.24 \div S_n^{0.12} \text{ O.C. (on center)}$$

Where:

%WL Beam = The percent of waterline beam

Page 277, Speed Adjustment For Hull-Bottom Girders, should read:

Increase hull-bottom girder-web height by 2 percent for every knot over **20** knots, not 15 knots as shown. (This is correct in the worked examples.)

Page 310, first paragraph, 2nd column, regarding chain and staggered welds: The sentence should read: Because the pitch is the same for both chain and staggered welds, in this rule staggered welds have **half** the total weld of chain welds. (Changed word in bold.)

Page 325, Aluminum Sheet Thickness For Small Boats, should read:

- Planing boats over 15 feet (4.5 m) should increase bottom plate in the forward third of the hull to **0.090** inch (2.29 mm).