

Section at basing in  
way of existing Bidge  
neglecting local minis  
for E.B. span

# MODULUS OF SECTION

NAME:— S.S. FRATERNITAS  
Particulars of Vessel 470 x 58 x 35.25 35.42 1<sup>st</sup> mtry  
Height of Assumed Axis above Keel 16'0"

BELOW ASSUMED AXIS.								ABOVE ASSUMED AXIS.							
ITEM.	SCANTLING.	AREA.	h.	Ah.	Ah <sup>2</sup> .	d.	Ad <sup>2</sup> .	ITEM.	SCANTLING.	AREA.	h.	Ah.	Ah <sup>2</sup> .	d.	Ad <sup>2</sup> .
FLAT KEEL <i>1<sup>st</sup> mtry</i>	<i>1/2</i> 39 x 1.00	19.5	16.04	313	5020			TOP DECK STRINGER <i>Bidge</i>	<i>1/2</i> 50 x .63	22.5	27.25	613	16710		
" " "	<i>1/2</i> 25 x .75	9.4	15.46	150	2395			" " "							
CENTRE GIRDER PLATE	<i>1/2</i> 60 x .55	16.5	13.5	223	3010	5.0	412	" " ANGLE <i>1<sup>st</sup> mtry</i>	<i>3/8</i> 3 1/2 x 40	2.6	27.25	71	1930		
" " BOTTOM ANGLES	<i>1/2</i> 4 1/2 x .65	5.4	15.9	86	1365			" " PLATING <i>1<sup>st</sup> mtry</i>	<i>20</i> 1/2 x 40	84.4	27.25	2340	65000		
" " TOP ANGLES	<i>1/2</i> 4 x .50	3.7	11.1	41	456			2ND DECK STRINGER	<i>7/8</i> 2 1/2 x 75	51.6	19.6	1000	19600		
CENTRE STRAKE TANK TOP	<i>1/2</i> 42 x .55	11.5	11.0	127	1400			" " ANGLE <i>1<sup>st</sup> mtry</i>	<i>4</i> 4 x .50	3.7	19.6	72	1420		
MARGIN PLATE	<i>1/2</i> 65 x .55	35.7	12.7	454	5760	4.4	690	" " PLATING <i>1<sup>st</sup> mtry</i>	<i>57</i> 1/2 x .50	28.5	19.8	565	11180		
" " ANGLES	<i>1/2</i> 4 x .55	4.1	14.8	61	900			" " PLATING <i>1<sup>st</sup> mtry</i>	<i>7</i> 3/8 x .50	13.3	20.0	270	5400		
BOTTOM PLATING <i>2<sup>nd</sup> mtry</i>	<i>1/2</i> 54 x .75	40.5	15.9	644	10240		600	3RD DECK STRINGER	<i>1</i> 60 x .60	36.0	20.15	726	14620		
BILGE PLATING	<i>1/2</i> 51 x .70	35.7	13.0	546	7870	3.62	550	" " ANGLE <i>1<sup>st</sup> mtry</i>	<i>7</i> 1/2 x .45	4.1	8.1	332	2730		
SIDE PLATING	<i>1/2</i> 48 x .70	40.0	13.0	546	7100	1.4	13450	" " PLATING	<i>1</i> 60 x .65	39.0	8.35	325	2730		
TANK TOP PLATING	<i>1/2</i> 54 x .75	40.5	15.9	644	10240			4TH DECK STRINGER <i>1<sup>st</sup> mtry</i>	<i>2</i> 5 1/2 x 60	56	8.6	48	415		
No. 1 SIDE STRINGER PLATE	<i>1/2</i> 45 x .50	22.5	16.2	4				" " ANGLE <i>1<sup>st</sup> mtry</i>	<i>30</i> 1/2 x 60	18.0	8.7	156	1260	2.5	112
" " " ANGLES	<i>1/2</i> 6 1/2 x .75	7.7	18.5	14	26			" " PLATING	<i>4</i> 6 1/2 x 60	23.2	25.55	544	15180	3.87	348
No. 2 " " PLATE	<i>1/2</i> 4 1/2 x .50	2.2	6.4	14	90			" " PLATING	<i>4</i> 3 1/2 x 45	19.6	22.0	431	9480	3.62	257
" " " ANGLES	<i>1/2</i> 6 1/2 x .75	7.7	6.65	51	340			SHEERSTRAKE	<i>1</i> 4 1/2 x 80	36.8	18.5	681	12600	3.83	540
No. 3 " " PLATE	<i>1/2</i> 4 1/2 x .50	2.2	6.4	14	90			" " PLATING	<i>1</i> 37 x 70	25.9	18.4	477	8780	3.08	245
" " " ANGLES	<i>1/2</i> 6 1/2 x .75	7.7	6.65	51	340			STRAKE BELOW SHEERSTRAKE	<i>1</i> 54 x 70	37.8	14.8	560	8280	2.5	766
SIDE KEELSON PLATE								SHELL PLATING	<i>1</i> 42 x 70	29.5	14.8	435	6440	3.5	360
" " TOP ANGLES								" " PLATING	<i>1</i> 168 x 70	117.6	6.5	765	4970	13.12	20220
" " BOTTOM "								SIDE STRINGER PLATE	<i>1</i> 4 1/2 x .50	2.2	8.1	6			
TOTALS BELOW ASSUMED AXIS.		606.7		7313	97001		15702	" " ANGLES	<i>1</i> 6 1/2 x 75	7.7	2.85	22	62		
								" " PLATING	<i>1</i> 4 1/2 x .50	2.2	13.65	30	410		
								" " PLATING	<i>1</i> 6 1/2 x 50	5.2	13.40	70	930		
								TOTALS ABOVE ASSUMED AXIS.		657.4		10620	210437		22848
								" " BELOW ASSUMED AXIS.		606.7		7313	97001		15702
								SUM OR DIFFERENCE		1264.1	2.65	3307	307438		38550
								Ad <sup>2</sup> /12							3212

LLC = f.d.13 = 7  
24500 = 14.65 x 1658  
d = 24500 / 14.65 = 1672  
23300 = -52  
27.42

Securi *1<sup>st</sup> mtry* at 500% 688. *1<sup>st</sup> mtry* 28.42 mtr  
2<sup>nd</sup> mtry at 14.65  
Thurs *1<sup>st</sup> mtry* 24500 - 2<sup>nd</sup> mtry 28.42 mtr

N.B.—The assumed axis is to be taken below lowest deck. The Top Deck is the uppermost strength deck, and other decks are to be numbered from that deck.

*1<sup>st</sup> mtry* 28.42 mtr

SUMMARY.	
MOMENT OF INERTIA ABOUT ASSUMED AXIS ...	307438
NEUTRAL AXIS ABOVE ASSUMED AXIS (x) ...	2.65
TOTAL AREA x x <sup>2</sup> ...	6040
CORRECTED INERTIA (ONE SIDE ONLY) = (1)-(3) ...	301398
CORRECTED INERTIA (BOTH SIDES) ...	602796
VALUE OF "Y" AT HEEL OF GUNWALE BAR ...	24.547
MODULUS OF SECTION AT GUNWALE ...	24500
VALUE OF "Y" AT KEEL ...	18.648
MODULUS OF SECTION AT KEEL ...	32200

Initials *1.8*  
22.6.36  
Date

MODULUS OF ELASTICITY

NAME:

DATE:

BY:

TEST NO.:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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*Stratocaulis*  
Feb. 10 1953  
Modulus of Elasticity

W133-0130



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