APPENDIX B

DESIGN DATA FOR STRUCK SHIPS IN TEST CASES

B.1 150,000 DWT DOUBLE HULL TANKE

IMO 150k dwt Double Hull Reference Tanker

Information Book

For

Grounding and Collision Analysis

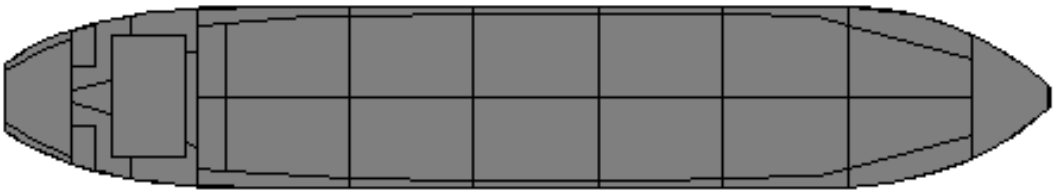
Update: October 15, 1999

A. J. Brown

Chapter 1 Naval Architecture

L = 264 m B = 48 m D = 24 m T = 16.8 m Δ = 178867 MT

1.1 PROFILE AND PLAN



1.2 WEIGHTS AND STABILITY

Full Load Departure

Item	Weight MT	VCG m	LCG m-MS	TCG m-CL	FSMom m-MT
Light Ship	22,849	12.960	1.380F	0.000	----
Constant	673	20.740	10.013A	0.000	----
Cargo Oil	150,056	13.523	12.767F	0.000S	254,794
Fuel Oil	4,328	17.069	93.920A	0.004S	3,395
Diesel Oil	334	17.986	106.941A	0.392P	88
Lube Oil	129	16.661	101.003A	7.355P	41
Fresh Water	498	22.596	116.193A	0.000	0
SW Ballast	0	----	----	----	----
Misc.	0	----	----	----	----
Misc. Weights	0	----	----	----	----
Displacement	178,867	13.600	7.980F	0.006P	258,318

Stability Calculation			Trim Calculation		
KMt	19.676	m	LCF Draft	16.800	m
VCG	13.600	m	LCB (even keel)	7.981F	m-MS
GMt (Solid)	6.076	m	LCF	0.217A	m-MS
FSc	1.444	m	MT1cm	2,111	m-MT
GMt (Corrected)	4.632	m	Trim	0.000	m
			List	0.1S	deg

1.3 PRIMARY SUBDIVISION

Double Bottom: h_{DB} = 2.32 meters

Double Side: w = 2 meters

	Compartment	Mir	# Sta	Aft m-MS	Fwd m-MS
1	FOREPEAK	N	7	119.000F	139.400F
2	FOCSLE DECK	N	5	119.000F	139.000F
3	NO.1 WBT S	Y	13	86.000F	119.000F
4	NO.1 COT S	N	13	86.000F	119.000F
5	NO.1 WBT P	N	13	86.000F	119.000F
6	NO.1 COT P	N	13	86.000F	119.000F
7	NO.2 WBT S	Y	9	53.000F	86.000F
8	NO.2 COT S	Y	9	53.000F	86.000F
9	NO.2 WBT P	N	9	53.000F	86.000F
10	NO.2 COT P	N	9	53.000F	86.000F
11	NO.3 WBT S	Y	7	20.000F	53.000F
12	NO.3 COT S	Y	7	20.000F	53.000F
13	NO.3 WBT P	N	7	20.000F	53.000F
14	NO.3 COT P	N	7	20.000F	53.000F

15	NO.4 WBT S	Y	9	13.000A	20.000F
16	NO.4 COT S	Y	9	13.000A	20.000F
17	NO.4 WBT P	N	9	13.000A	20.000F
18	NO.4 COT P	N	9	13.000A	20.000F
19	NO.5 WBT S	Y	7	46.000A	13.000A
20	NO.5 COT S	Y	7	46.000A	13.000A
21	NO.5 WBT P	N	7	46.000A	13.000A
22	NO.5 COT P	N	7	46.000A	13.000A
23	NO.6 WBT S	Y	11	86.500A	46.000A
24	NO.6 COT S	Y	9	79.000A	46.000A
25	NO.6 WBT P	N	11	86.500A	46.000A
26	NO.6 COT P	N	9	79.000A	46.000A
27	SLOP TANK S	Y	5	86.500A	79.000A
28	SLOP TANK P	N	5	86.500A	79.000A

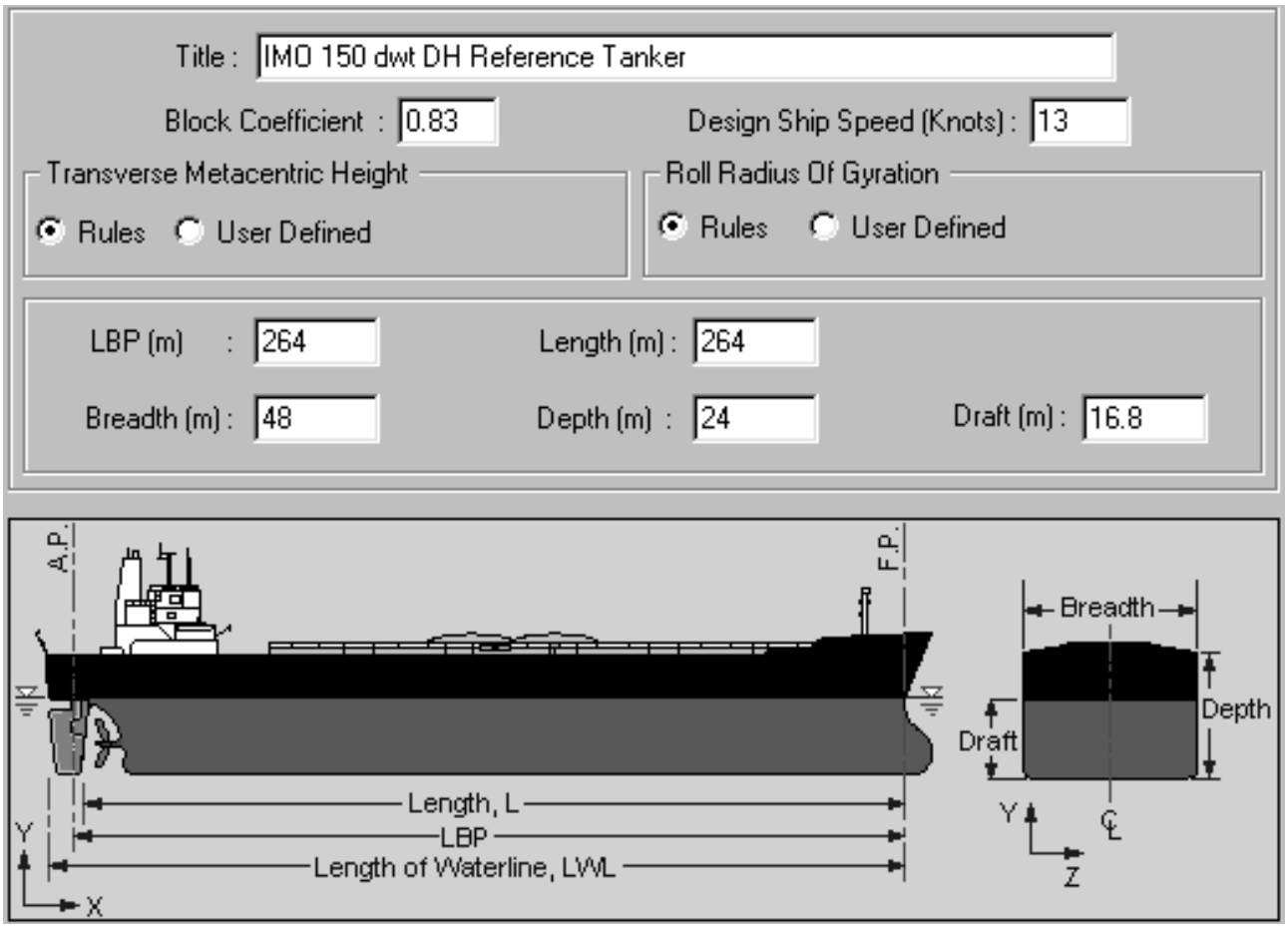
1.4 FULL LOAD CARGO

Full Load Departure

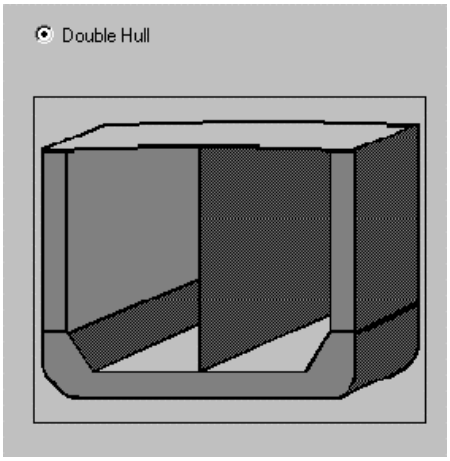
Cargo Oil Tank Name	Weight MT	% Full	Capacity MT	VCG m-BL	LCG m-MS	TCG m-CL	FSmom m-MT	Density MT/m3	Volume m3
NO.1 COT P	8,462	98.0	8,635	13.876	100.607F	7.268P	8,506	0.8550	9,897
NO.1 COT S	8,462	98.0	8,635	13.876	100.607F	7.268S	8,506	0.8550	9,897
NO.2 COT P	12,677	98.0	12,935	13.418	69.217F	10.388P	21,834	0.8550	14,827
NO.2 COT S	12,677	98.0	12,935	13.418	69.217F	10.388S	21,835	0.8550	14,827
NO.3 COT P	13,309	98.0	13,580	13.316	36.449F	10.891P	24,454	0.8550	15,566
NO.3 COT S	13,309	98.0	13,580	13.316	36.449F	10.891S	24,454	0.8550	15,566
NO.4 COT P	13,382	98.0	13,655	13.302	3.504F	10.950P	24,757	0.8550	15,652
NO.4 COT S	13,382	98.0	13,655	13.302	3.504F	10.950S	24,757	0.8550	15,652
NO.5 COT P	13,105	98.0	13,373	13.357	29.387A	10.727P	23,627	0.8550	15,328
NO.5 COT S	13,105	98.0	13,373	13.357	29.387A	10.727S	23,627	0.8550	15,328
NO.6 COT P	11,875	98.0	12,117	13.802	61.844A	9.877P	20,440	0.8550	13,889
NO.6 COT S	11,875	98.0	12,117	13.802	61.844A	9.877S	20,440	0.8550	13,889
SLOP TANK P	2,218	98.0	2,263	14.826	82.680A	8.458P	3,778	0.8550	2,594
SLOP TANK S	2,218	98.0	2,263	14.826	82.680A	8.458S	3,778	0.8550	2,594
Totals	150,056	98.0	153,118	13.523	12.767F	0.000S	254,794		175,504

Chapter 2 Structural Design

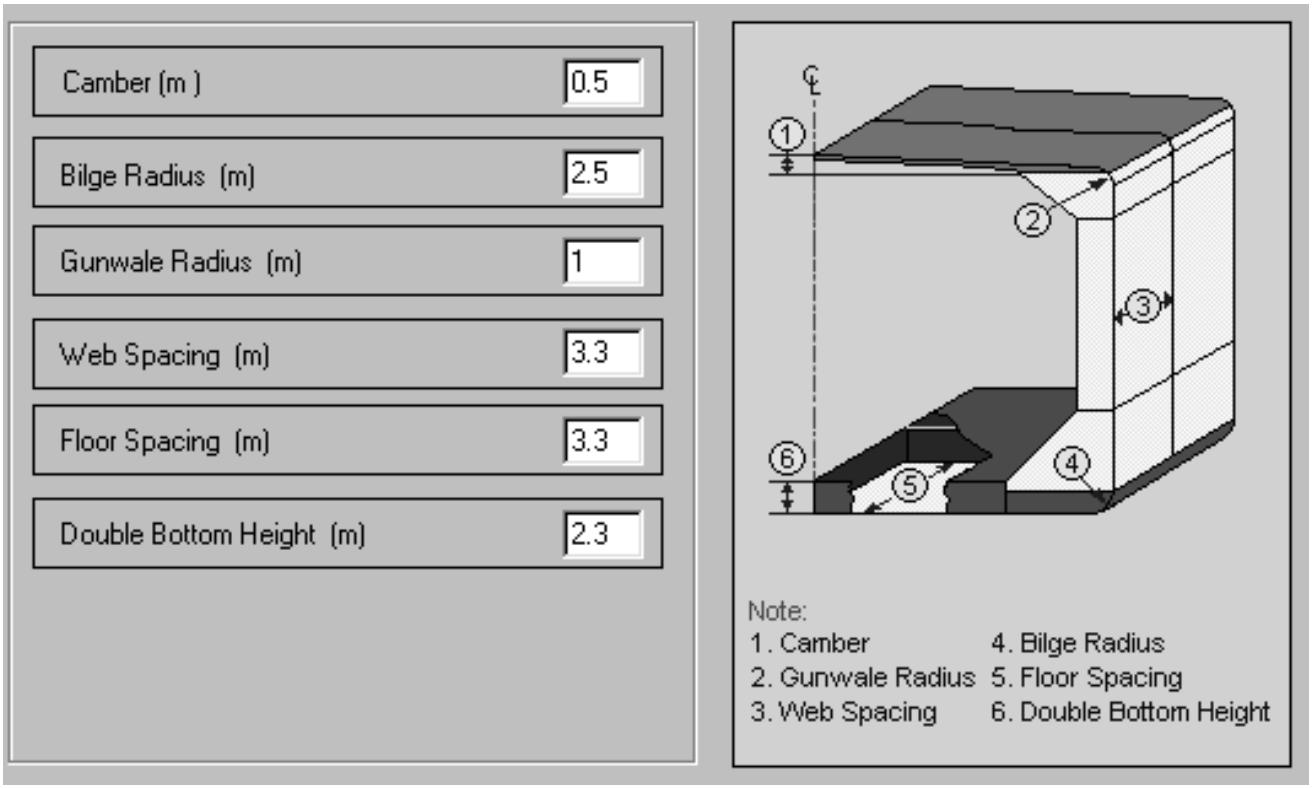
2.1 SHIP DIMENSIONS



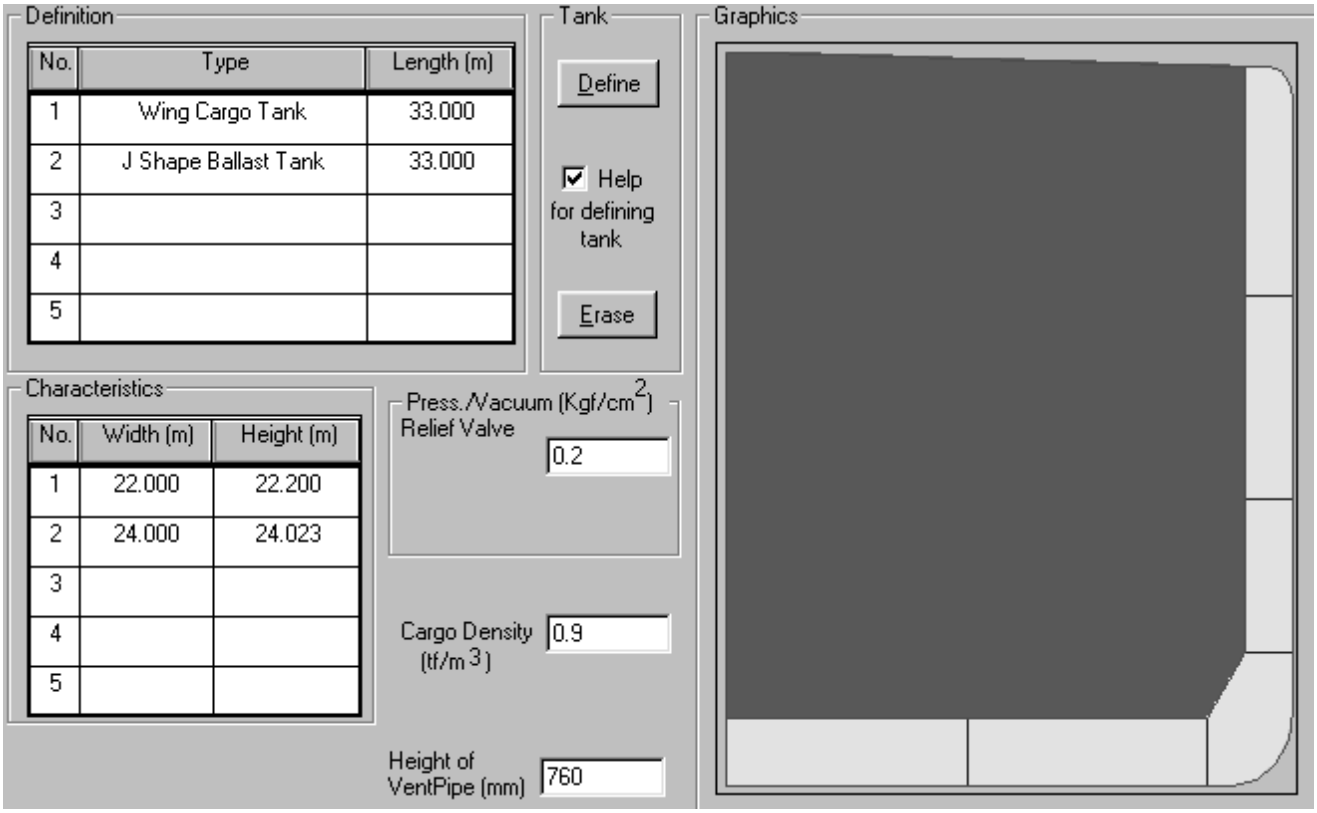
2.2 HULL TYPE



2.3 MIDSHIP GEOMETRY

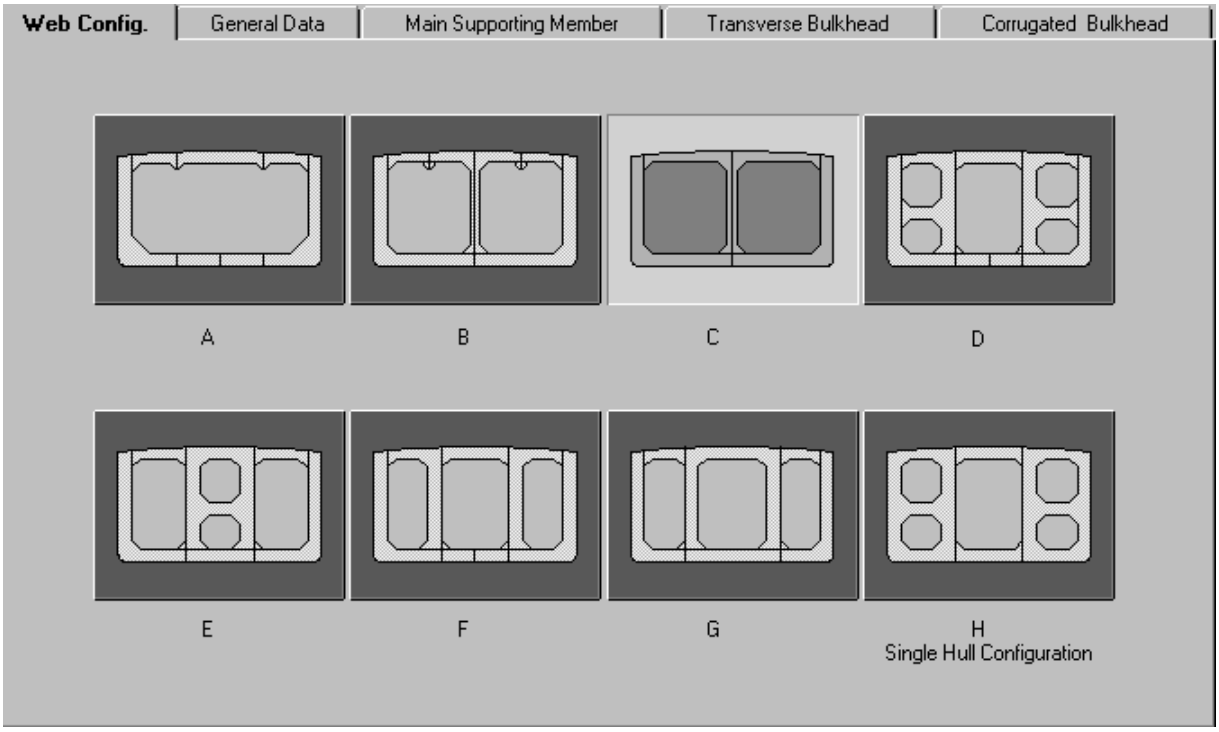


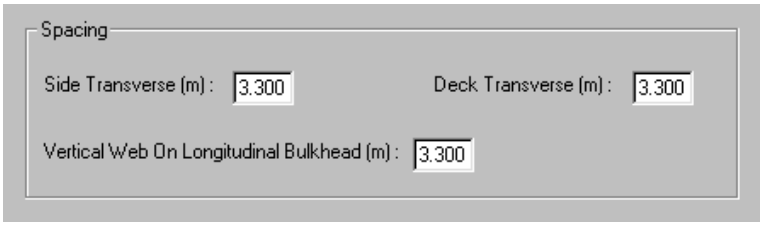
2.4 TANK DEFINITION



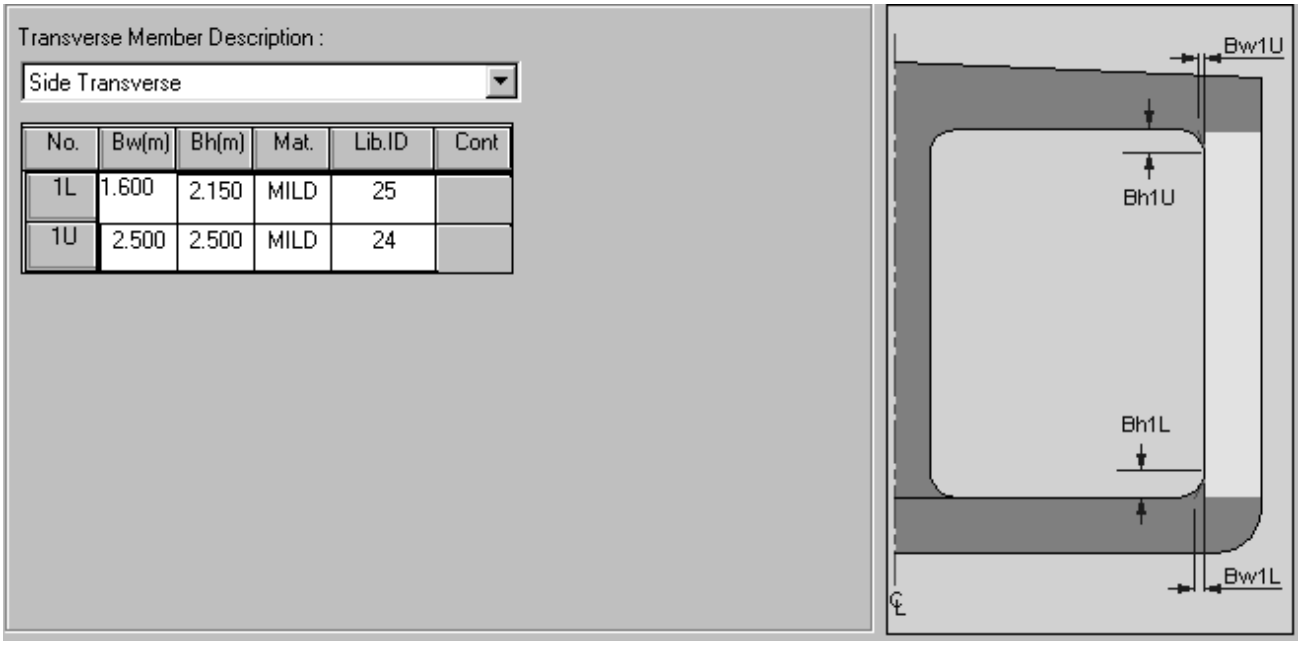
2.5 TRANSVERSE MEMBERS

2.5.1 Web Configuration



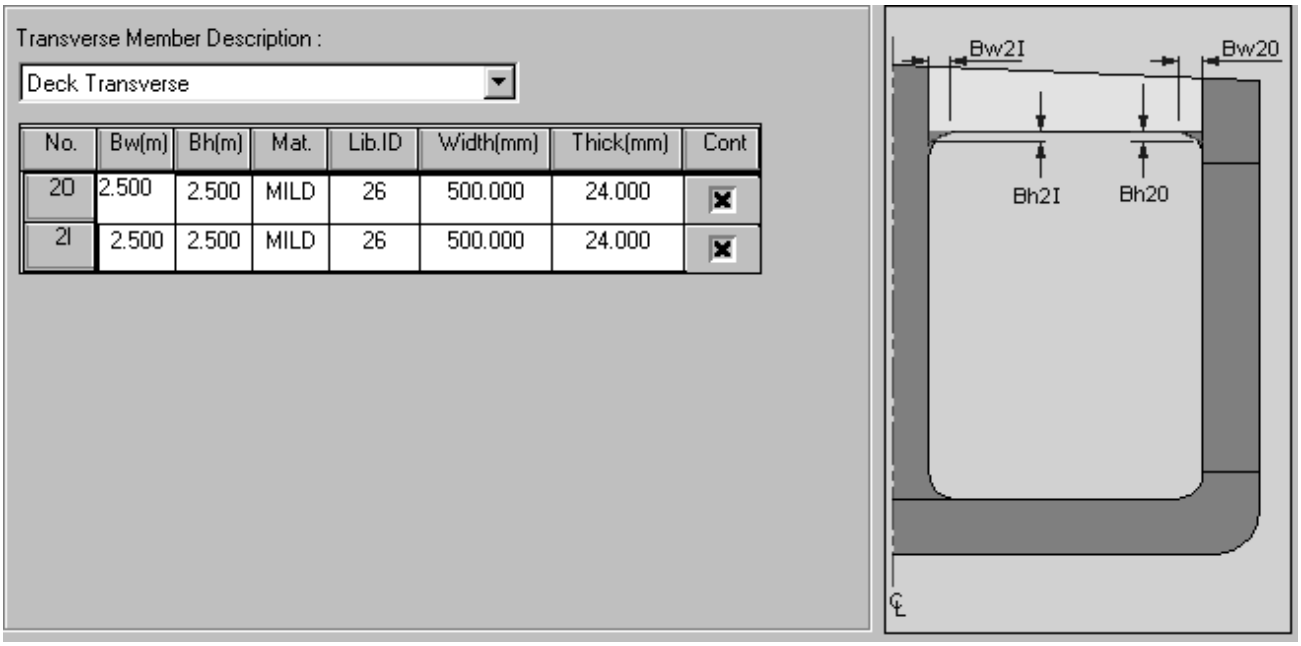


2.5.2 Main Supporting Members – Side Transverse (Web)



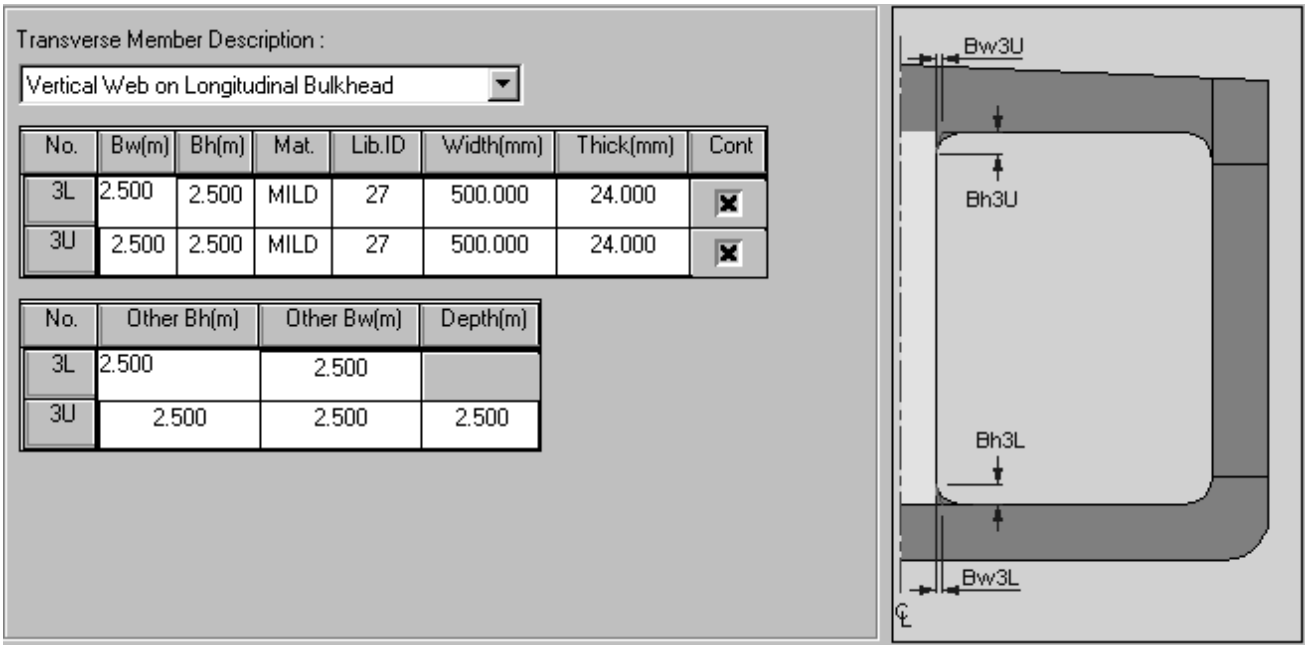
Web thickness upper = 12 mm
Web thickness lower = 18 mm

2.5.3 Main Supporting Members – Deck Transverse



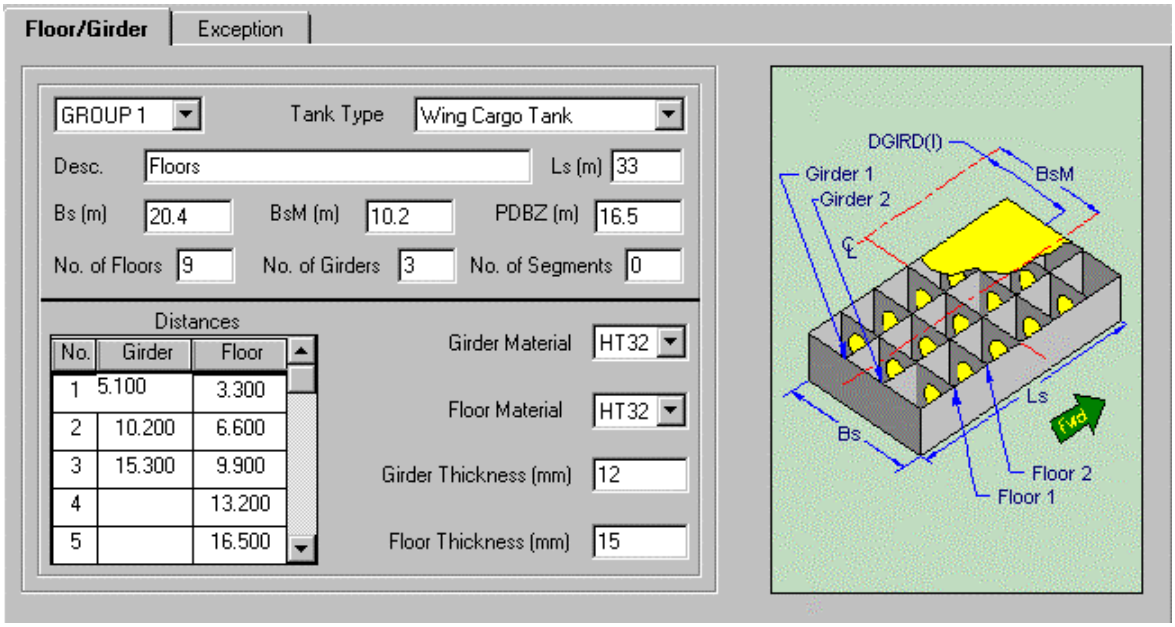
Deck Transverse Web thickness = 15 mm; Depth = 2.5 m

2.5.4 Main Supporting Members – Vertical Web on Longitudinal Bulkhead

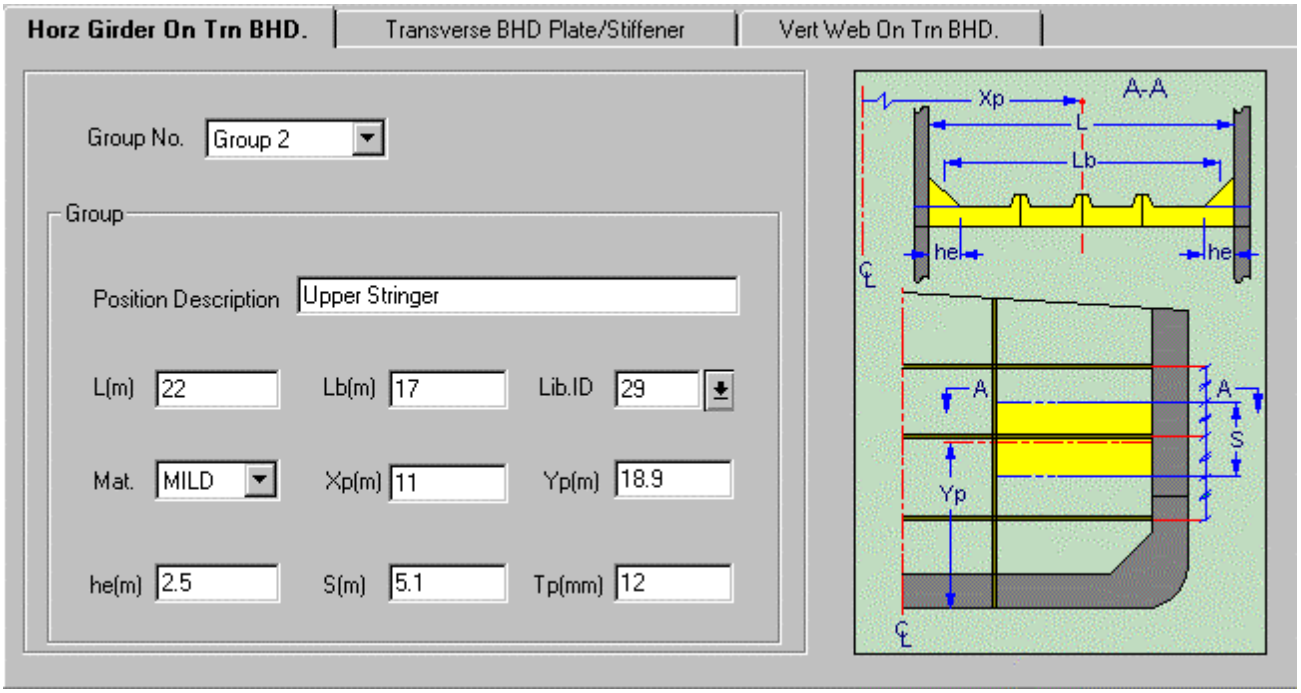


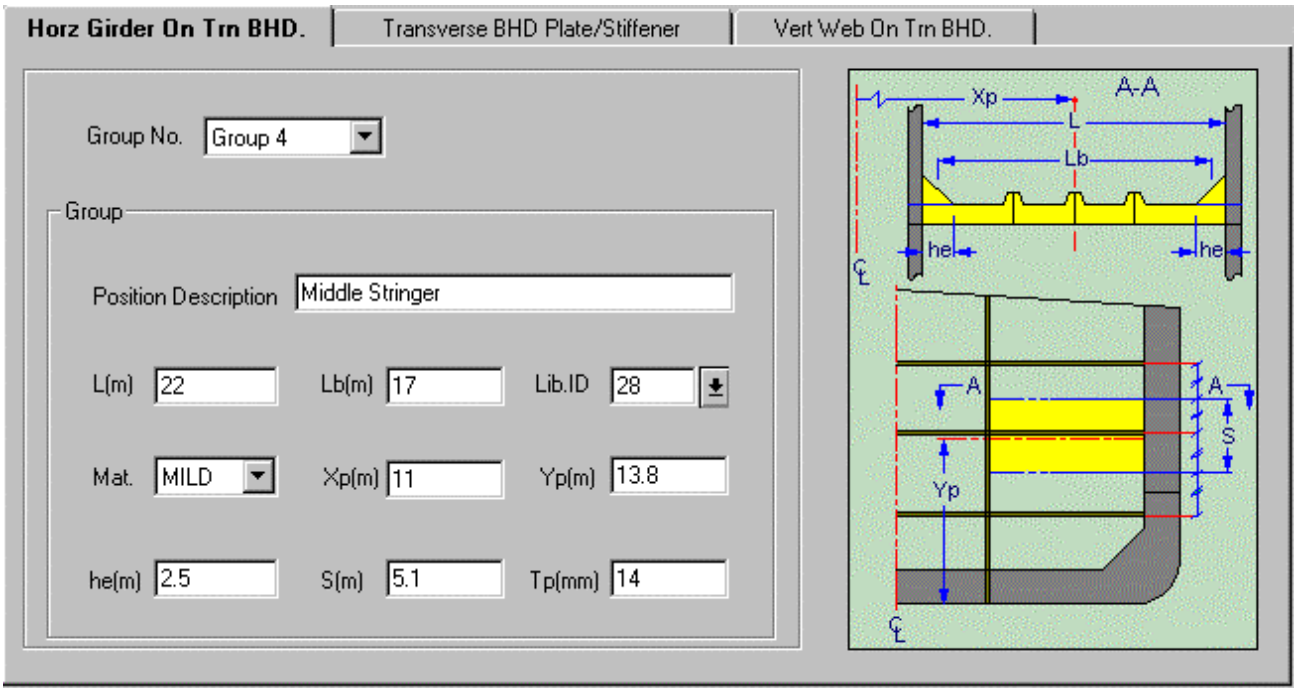
CL Bulkhead Vertical Web thickness = 14 mm; Depth = 2.0 m

2.5.5 Double Bottom Floor / Girder Properties



2.5.6 Transverse Bulkhead





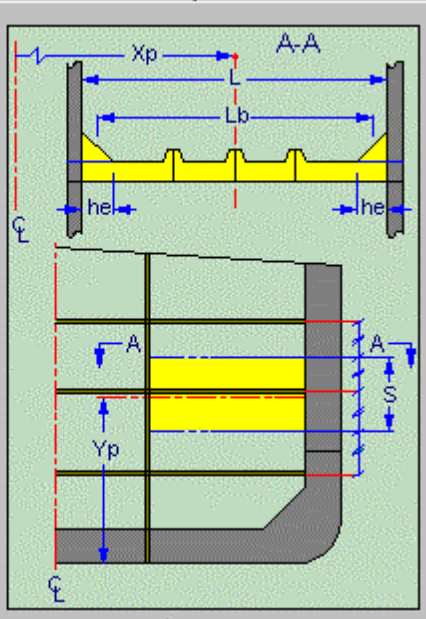
Horz Girder On Trn BHD. | Transverse BHD Plate/Stiffener | Vert Web On Trn BHD.

Group No. Group 1

Group

Position Description: Lower Stringer

L(m)	22	Lb(m)	17	Lib.ID	28
Mat.	MILD	Xp(m)	11	Yp(m)	8.7
he(m)	2.5	S(m)	4.675	Tp(mm)	18



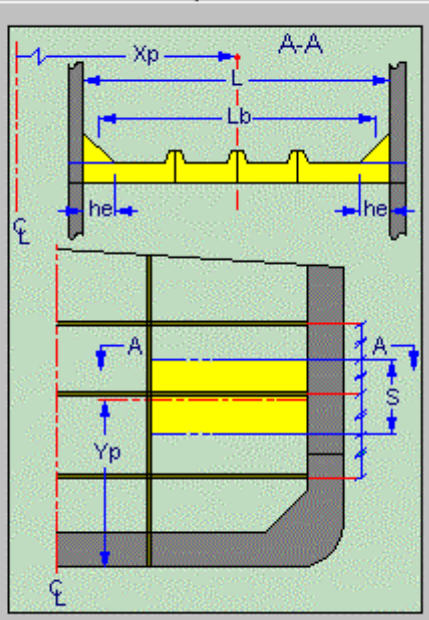
Horz Girder On Trn BHD. | Transverse BHD Plate/Stiffener | Vert Web On Trn BHD.

Group No. Group 3

Group

Position Description: Stool Level

L(m)	22	Lb(m)	17	Lib.ID	28
Mat.	MILD	Xp(m)	11	Yp(m)	4.45
he(m)	2.5	S(m)	3.2	Tp(mm)	18



Horz Girder On Trn BHD. | **Transverse BHD Plate/Stiffener** | Vert Web On Trn BHD.

TB Group 1 | Tank Type: Wing Cargo Tank

Description: Upper | Xap (m): 152

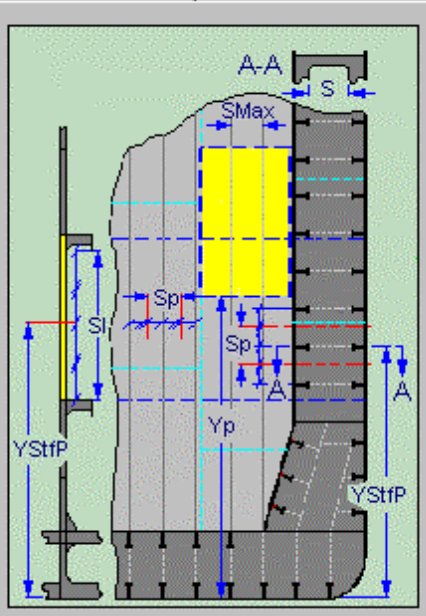
Plate

Group: Plate 1 | Zp (m): 11 | SMax (mm): 850 | Yp (m): 18.9

Description: TB Upper | Thick.(mm): 12 | Mat: MILD

Stiffener

No.	Type	Sp(mm)	Sl(m)	ZStfp(m)	YStfp(m)	Lib.ID	Mat.
1	1	850.00	5.100	11.000	21.450	11	MILD
2							
3							
4							
5							



Horz Girder On Trn BHD. | **Transverse BHD Plate/Stiffener** | Vert Web On Trn BHD.

TB Group 2 | Tank Type: Wing Cargo Tank

Description: Middle | Xap (m): 152

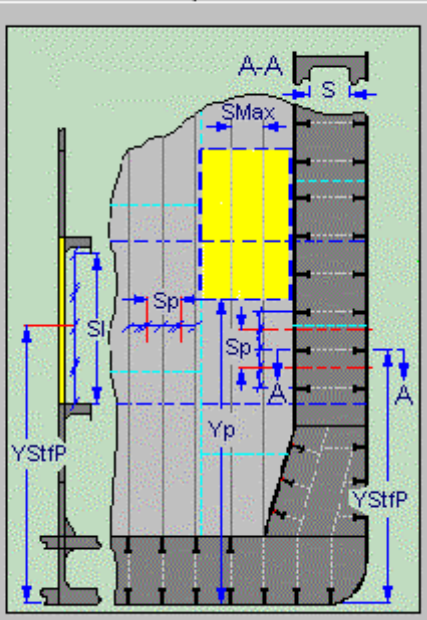
Plate

Group: Plate 1 | Zp (m): 11 | SMax (mm): 850 | Yp (m): 13.8

Description: TB Middle | Thick.(mm): 14 | Mat: MILD

Stiffener

No.	Type	Sp(mm)	Sl(m)	ZStfp(m)	YStfp(m)	Lib.ID	Mat.
1	1	850.00	5.100	11.000	16.350	16	MILD
2							
3							
4							
5							



Horz Girder On Trn BHD. | **Transverse BHD Plate/Stiffener** | Vert Web On Trn BHD.

TB Group 3 | Tank Type: Wing Cargo Tank

Description: Lower | Xap (m): 152

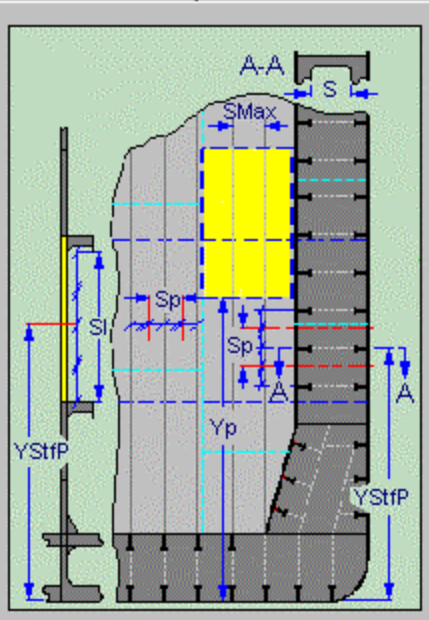
Plate

Group: Plate 1 | Zp (m): 11 | SMax (mm): 850 | Yp (m): 8.7

Description: TB Lower | Thick.(mm): 16 | Mat: MILD

Stiffener

No.	Type	Sp(mm)	Sl(m)	ZStfp(m)	YStfp(m)	Lib.ID	Mat.
1	1	850.00	5.100	11.000	11.250	20	MILD
2							
3							
4							
5							



Horz Girder On Trn BHD. | **Transverse BHD Plate/Stiffener** | Vert Web On Trn BHD.

TB Group 4 | Tank Type: Wing Cargo Tank

Description: Stool | Xap (m): 152

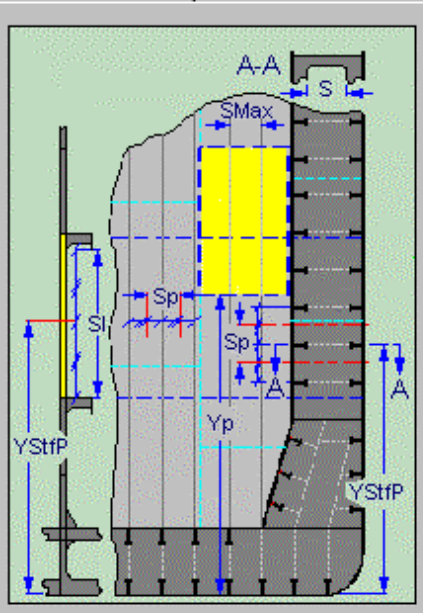
Plate

Group: Plate 1 | Zp (m): 11 | SMax (mm): 850 | Yp (m): 4.45

Description: TB Stool | Thick.(mm): 18 | Mat: MILD

Stiffener

No.	Type	Sp(mm)	Sl(m)	ZStfp(m)	YStfp(m)	Lib.ID	Mat.
1	1	850.00	4.250	11.000	6.575	18	MILD
2							
3							
4							
5							



Horz Girder On Trn BHD. | **Transverse BHD Plate/Stiffener** | Vert Web On Trn BHD.

TB Group 8 | Tank Type: Wing Cargo Tank

Description: Bottom | Xap (m): 152

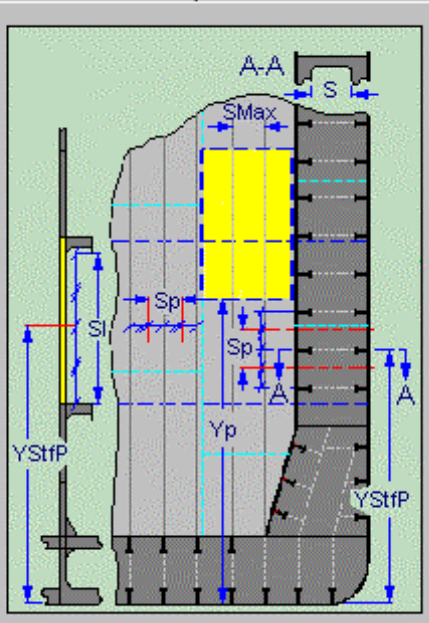
Plate

Group: Plate 1 | Zp (m): 11 | SMax (mm): 850 | Yp (m): 2.3

Description: TB Bottom | Thick.(mm): 18 | Mat: MILD

Stiffener

No.	Type	Sp(mm)	Sl(m)	ZStfp(m)	YStfp(m)	Lib.ID	Mat.
1	1	850.00	2.150	11.000	3.375	8	MILD
2							
3							
4							
5							



Horz Girder On Trn BHD. | **Transverse BHD Plate/Stiffener** | Vert Web On Trn BHD.

TB Group 5 | Tank Type: J Shape Ballast Tank

Description: Upper | Xap (m): 152

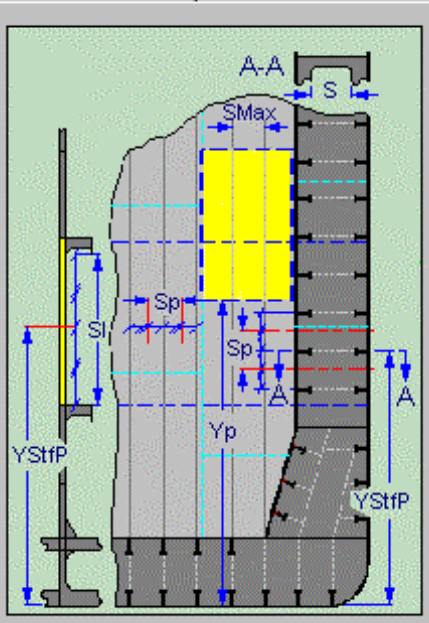
Plate

Group: Plate 1 | Zp (m): 23 | SMax (mm): 668 | Yp (m): 18.9

Description: J Tank TB Upper | Thick.(mm): 12 | Mat: MILD

Stiffener

No.	Type	Sp(mm)	Sl(m)	ZStfp(m)	YStfp(m)	Lib.ID	Mat.
1	1	668.00	5.100	23.000	21.450	10	MILD
2							
3							
4							
5							



Horz Girder On Trn BHD. | **Transverse BHD Plate/Stiffener** | Vert Web On Trn BHD.

TB Group 6 | Tank Type: J Shape Ballast Tank

Description: Middle | Xap (m): 152

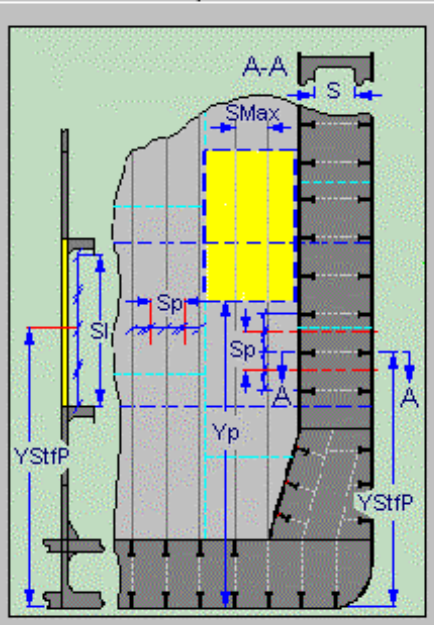
Plate

Group: Plate 1 | Zp (m): 23 | SMax (mm): 668 | Yp (m): 13.8

Description: J Tank TB Middle | Thick.(mm): 12 | Mat: MILD

Stiffener

No.	Type	Sp(mm)	Sl(m)	ZStfp(m)	YStfp(m)	Lib.ID	Mat.
1	1	668.00	5.100	11.000	16.350	14	MILD
2							
3							
4							
5							



Horz Girder On Trn BHD. | **Transverse BHD Plate/Stiffener** | Vert Web On Trn BHD.

TB Group 7 | Tank Type: J Shape Ballast Tank

Description: Lower | Xap (m): 152

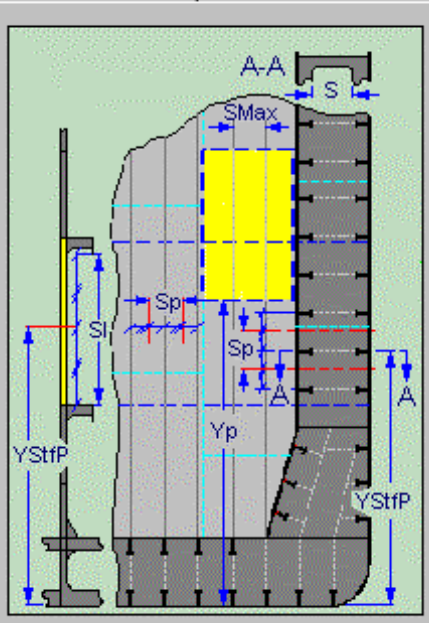
Plate

Group: Plate 1 | Zp (m): 23 | SMax (mm): 668 | Yp (m): 8.7

Description: J Tank TB Lower | Thick.(mm): 14 | Mat: MILD

Stiffener

No.	Type	Sp(mm)	Sl(m)	ZStfp(m)	YStfp(m)	Lib.ID	Mat.
1	1	668.00	5.100	23.000	11.250	17	MILD
2							
3							
4							
5							



Horz Girder On Trn BHD. | **Transverse BHD Plate/Stiffener** | Vert Web On Trn BHD.

TB Group 9 | Tank Type: J Shape Ballast Tank

Description: Stool | Xap (m): 152

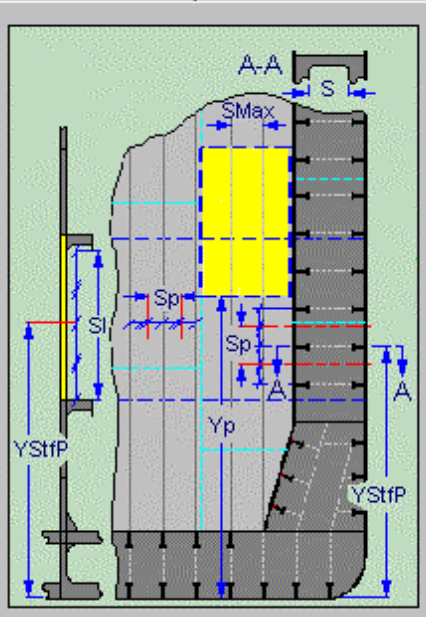
Plate

Group: Plate 1 | Zp (m): 23 | SMax (mm): 668 | Yp (m): 4.45

Description: J tank TB Stool | Thick.(mm): 14 | Mat: MILD

Stiffener

No.	Type	Sp(mm)	Sl(m)	ZStfp(m)	YStfp(m)	Lib.ID	Mat.
1	1	668.00	4.250	23.000	6.575	16	MILD
2							
3							
4							
5							



Horz Girder On Trn BHD. | **Transverse BHD Plate/Stiffener** | Vert Web On Trn BHD.

TB Group 10 | Tank Type: J Shape Ballast Tank

Description: IB | Xap (m): 152

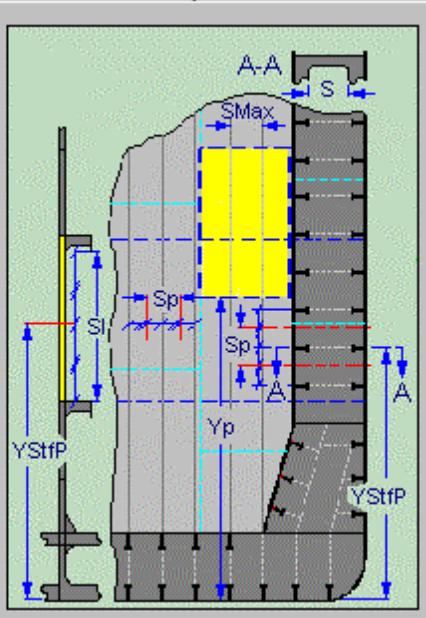
Plate

Group: Plate 1 | Zp (m): 12 | SMax (mm): 850 | Yp (m): 0

Description: TB IB | Thick.(mm): 20 | Mat: MILD

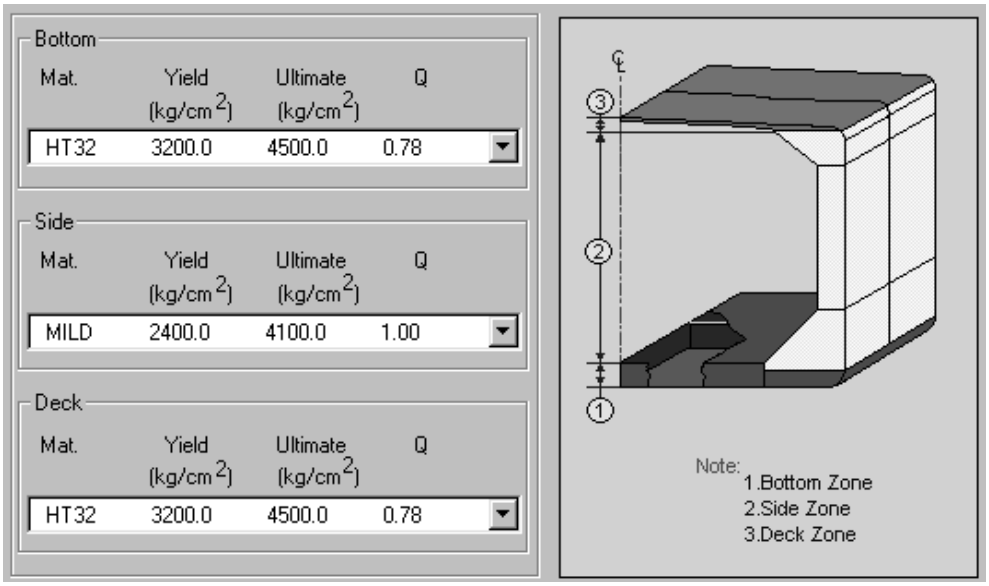
Stiffener

No.	Type	Sp(mm)	Sl(m)	ZStfp(m)	YStfp(m)	Lib.ID	Mat.
1	1	850.00	2.300	12.000	1.150	9	MILD
2							
3							
4							
5							



2.6 MATERIAL

2.6.1 Material Zones:



2.6.2 MATERIAL TABLE

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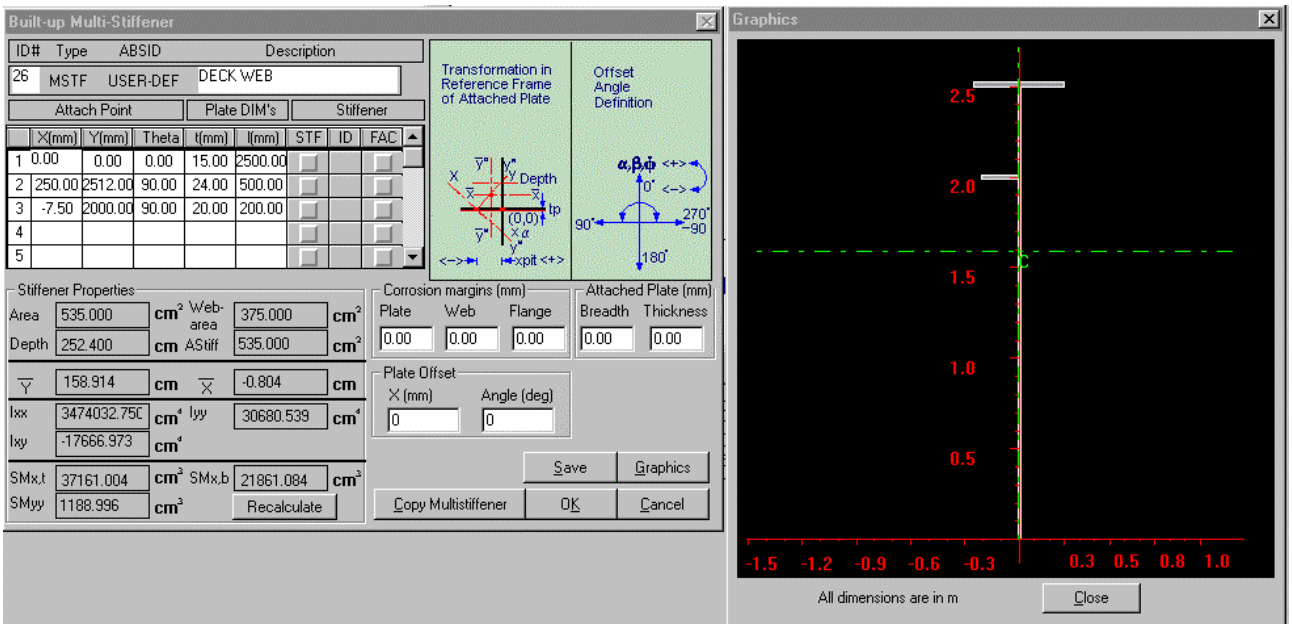
MAT #	MAT ID	YIELD STRESS	ULT STRESS	Q-FAC	Sm
(kgf/cm2)	(kgf/cm2)				
1	MILD	2400.	4100.	1.000	1.0
2	HT32	3200.	4500.	.780	.950
3	HT36	3600.	5000.	.720	.908
4	HT40	4000.	5200.	.680	.875

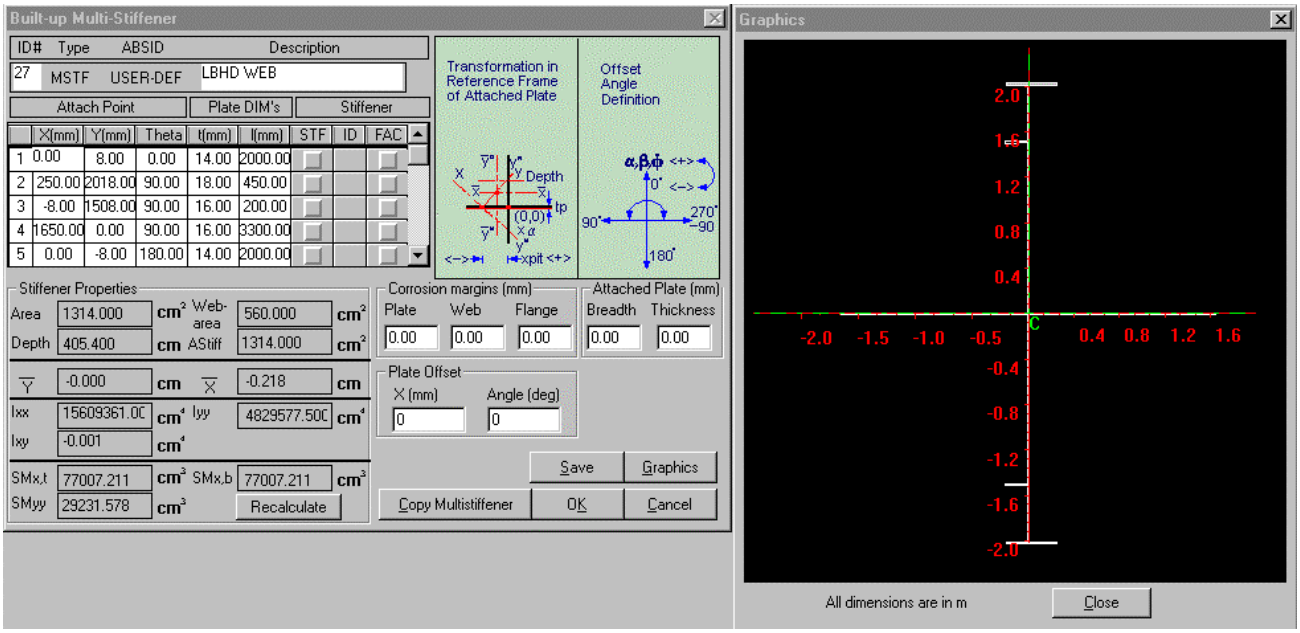
2.6.3 Stiffener Library:

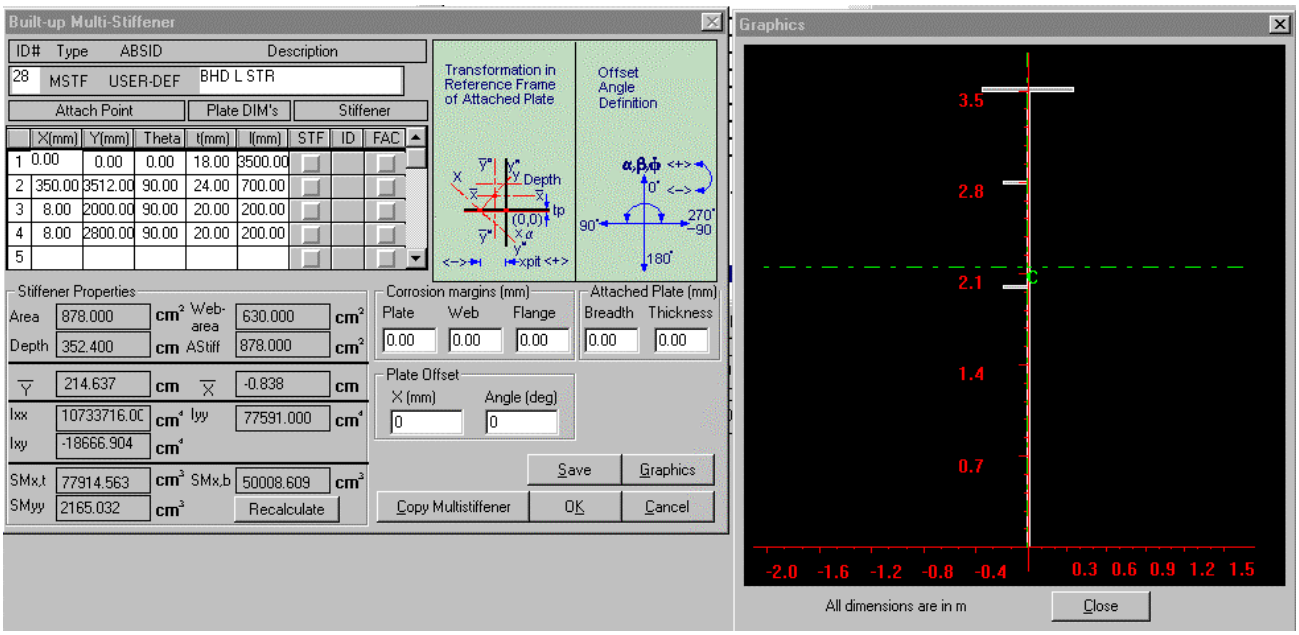
#ID#	TYPE	ABS ID	DESCRIPTION	VAR 1	VAR 2	VAR 3	VAR 4	VAR 5	VAR 6
#(dimensions)				(mm)	(mm)	(mm)	(mm)	(mm)	(mm)
1	LANG	ILA200A	200x90x9x12 LIA	200.00	90.00	9.00	12.00	7.50	15.00
2	LANG	ILA225A	225x90x9x12 LIA	225.00	90.00	9.00	12.00	7.50	15.00
3	LANG	ILA250A	250x90x9x13 LIA	250.00	90.00	9.00	13.00	7.50	15.00
4	LANG	ILA250B	250x90x10.5x15 LIA	250.00	90.00	10.50	15.00	7.50	15.00
5	LANG	ILA250C	250x90x11.5x16 LIA	250.00	90.00	11.50	16.00	7.50	15.00
6	LANG	ILA275A	250x100x10.5x14 LIA	275.00	100.00	10.50	14.00	7.50	15.00
7	LANG	ILA300A	300x100x10.5x15 LIA	300.00	100.00	10.50	15.00	7.50	15.00
8	LANG	ILA300B	300x100x11.5x16 LIA	300.00	100.00	11.50	16.00	7.50	15.00
9	LANG	ILA325A	325x120x10.5x14 LIA	325.00	120.00	10.50	14.00	10.00	20.00
10	LANG	ILA325B	325x120x11.5x15 LIA	325.00	120.00	11.50	15.00	10.00	20.00
11	LANG	ILA350A	350x120x10.5x16 LIA	350.00	120.00	10.50	16.00	10.00	20.00
12	LANG	ILA350B	350x120x11.5x18 LIA	350.00	120.00	11.50	18.00	10.00	20.00
13	LANG	ILA375A	375x120x10.5x18 LIA	375.00	120.00	10.50	18.00	10.00	20.00
14	LANG	ILA375B	375x120x11.5x20 LIA	375.00	120.00	11.50	20.00	10.00	20.00
15	LANG	ILA400A	400x120x11.5x23 LIA	400.00	120.00	11.50	23.00	10.00	20.00
16	LANG	ILA425A	425x120x11.5x24 LIA	425.00	120.00	11.50	24.00	10.00	20.00
17	LANG	ILA450A	450x120x11.5x25 LIA	450.00	120.00	11.50	25.00	10.00	20.00
18	LANG	ILA475A	475x120x11.5x28 LIA	475.00	120.00	11.50	28.00	10.00	20.00
19	LANG	ILA475B	475x120x12.5x30 LIA	475.00	120.00	12.50	30.00	10.00	20.00
20	LANG	ILA500A	500x120x12.5x33 LIA	500.00	120.00	12.50	33.00	10.00	20.00

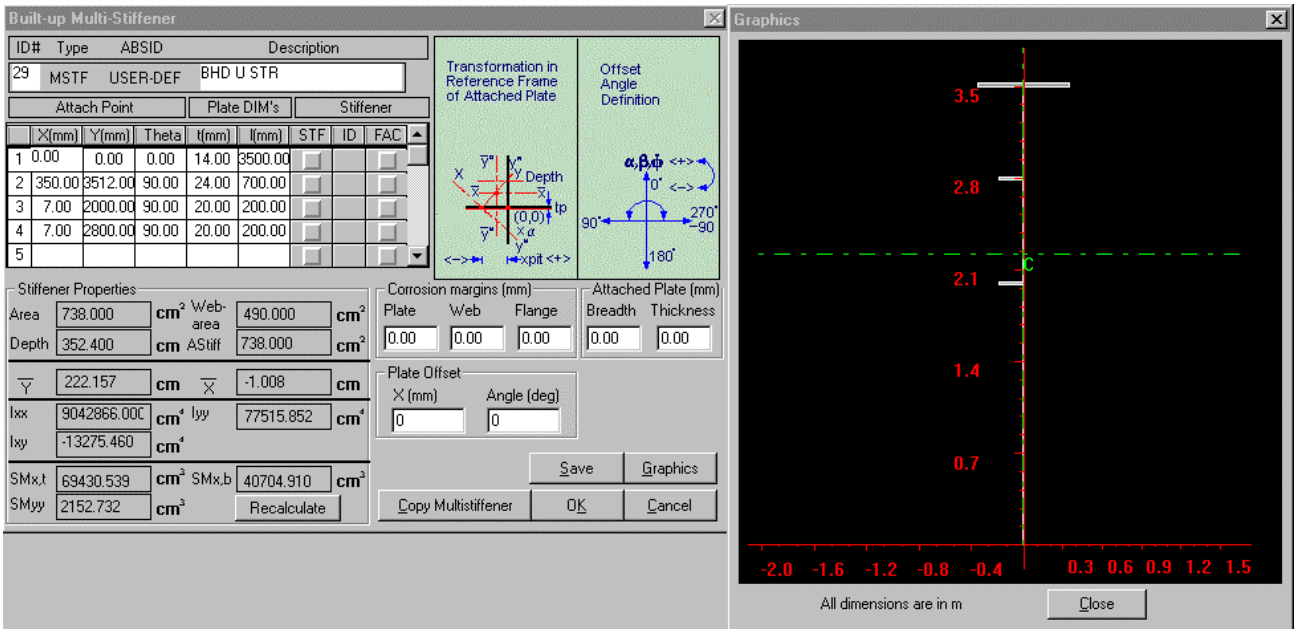
```
21    LANG ILA500B  500x120x13.5x35 LIA          500.00   120.00    13.50    35.00    10.00    20.00
22    FLAT USER-DEF FB 400x28                    400.00    28.00
23    UANG IUA150G  150X90X15 UIA                150.00    90.00    15.00    15.00     6.00    12.00
24    FLAT USER-DEF FB2000X12                   2000.00    12.00
25    FLAT USER-DEF FB2000X18                   2000.00    18.00
26    MSTF USER-DEF DECK WEB                          3
27    MSTF USER-DEF LBHD WEB                          7
28    MSTF USER-DEF BHD L STR                         4
29    MSTF USER-DEF BHD U STR                         4
```

2.6.4 User-Defined Shapes / Webs:



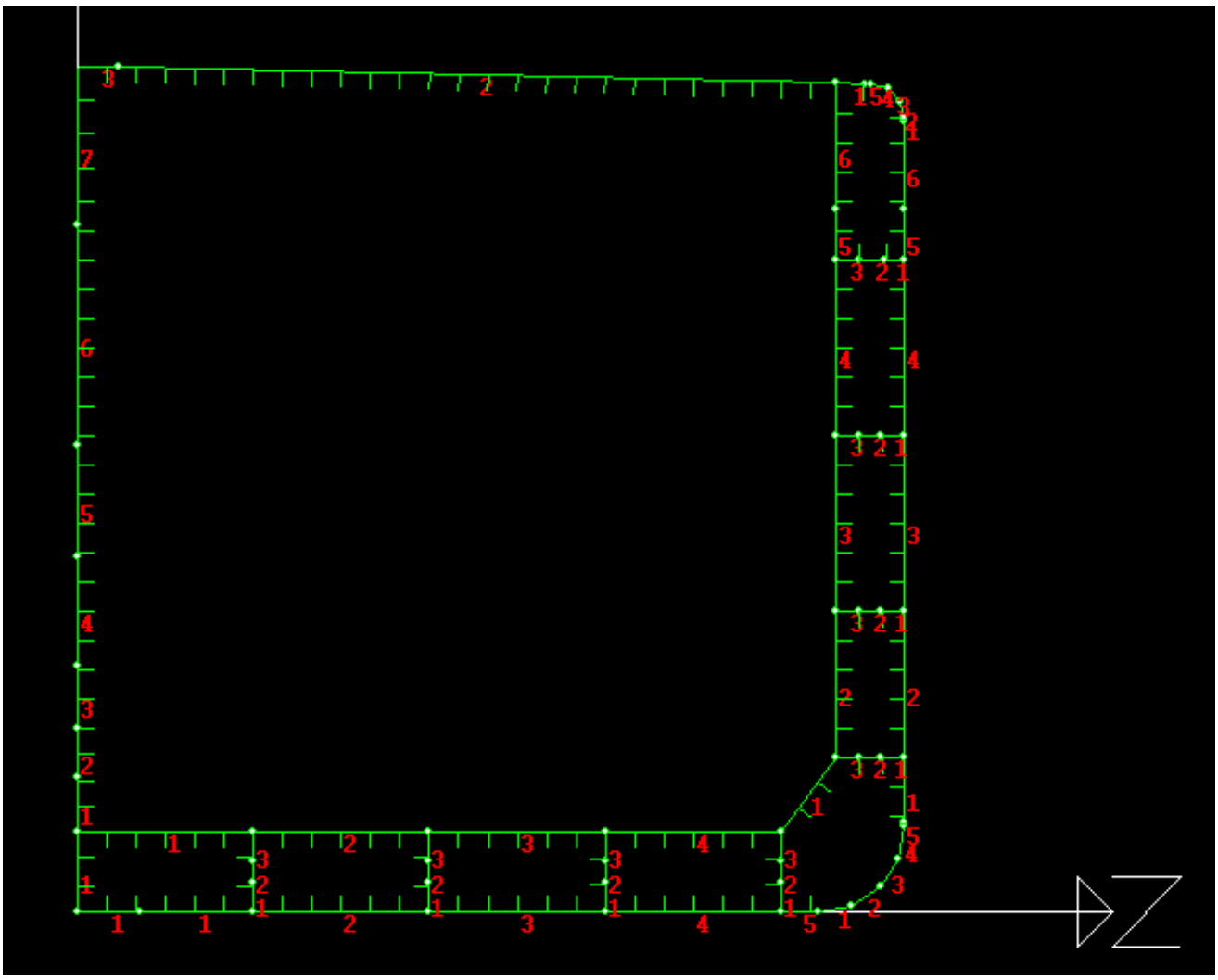



Built-up Multi-Stiffener
ID# Type ABSID Description
28 MSTF USER-DEF BHD L STR
Attach Point
Plate DIM's
Stiffener
X(mm) Y(mm) Theta t(mm) l(mm) STF ID FAC
1 0.00 0.00 0.00 18.00 3500.00
2 350.00 3512.00 90.00 24.00 700.00
3 8.00 2000.00 90.00 20.00 200.00
4 8.00 2800.00 90.00 20.00 200.00
5
Transformation in Reference Frame of Attached Plate
Offset Angle Definition
Depth
tp
(0,0)
xpit
Stiffener Properties
Area 878.000 cm²
Web-area 630.000 cm²
Depth 352.400 cm
AStiff 878.000 cm²
214.637 cm -0.838 cm
Ixx 10733716.0C cm⁴
Iyy 77591.000 cm⁴
Ixy -18666.904 cm⁴
SMx,t 77914.563 cm³
SMx,b 50008.609 cm³
SMyy 2165.032 cm³
Recalculate
Corrosion margins (mm)
Plate Web Flange
0.00 0.00 0.00
Attached Plate (mm)
Breadth Thickness
0.00 0.00
Plate Offset
X (mm) Angle (deg)
0 0
Save
Graphics
Copy Multistiffener
OK
Cancel
Graphics
3.5
2.8
2.1
1.4
0.7
-2.0 -1.6 -1.2 -0.8 -0.4
0.3 0.6 0.9 1.2 1.5
All dimensions are in m
Close

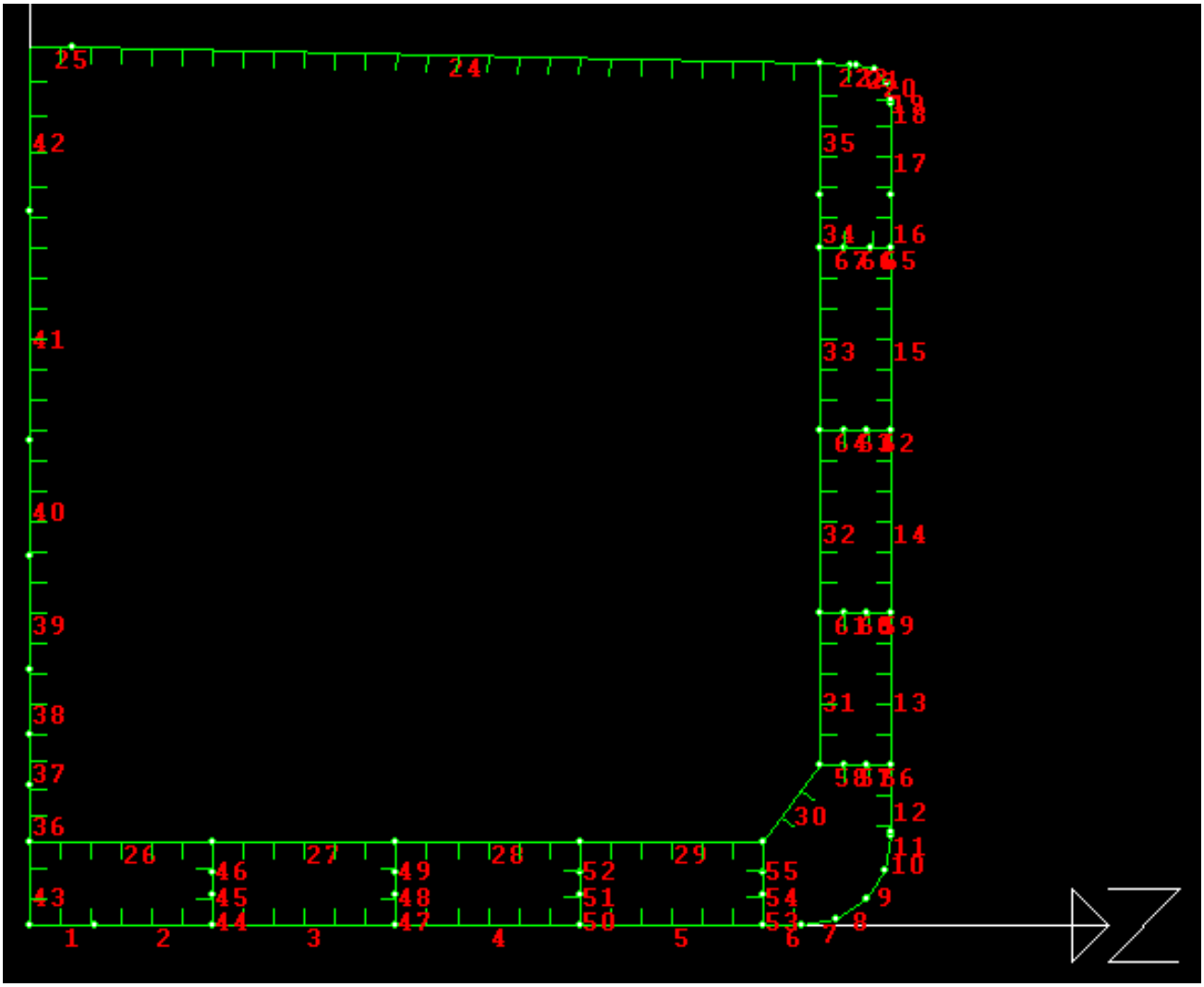

Built-up Multi-Stiffener
ID# Type ABSID Description
29 MSTF USER-DEF BHD U STR
Attach Point
Plate DIM's
Stiffener
X(mm) Y(mm) Theta t(mm) l(mm) STF ID FAC
1 0.00 0.00 0.00 14.00 3500.00
2 350.00 3512.00 90.00 24.00 700.00
3 7.00 2000.00 90.00 20.00 200.00
4 7.00 2800.00 90.00 20.00 200.00
5
Transformation in Reference Frame of Attached Plate
Offset Angle Definition
Depth
tp
(0,0)
xpit
Stiffener Properties
Area 738.000 cm²
Web-area 490.000 cm²
Depth 352.400 cm
AStiff 738.000 cm²
222.157 cm -1.008 cm
Ixx 9042866.00C cm⁴
Iyy 77515.852 cm⁴
Ixy -13275.460 cm⁴
SMx,t 69430.539 cm³
SMx,b 40704.910 cm³
SMyy 2152.732 cm³
Recalculate
Corrosion margins (mm)
Plate Web Flange
0.00 0.00 0.00
Attached Plate (mm)
Breadth Thickness
0.00 0.00
Plate Offset
X (mm) Angle (deg)
0 0
Save
Graphics
Copy Multistiffener
OK
Cancel
Graphics
3.5
2.8
2.1
1.4
0.7
-2.0 -1.6 -1.2 -0.8 -0.4
0.3 0.6 0.9 1.2 1.5
All dimensions are in m
Close

2.7 LONGITUDINAL PLATE AND STIFFENER ELEMENTS

2.7.1 Local Plate IDs:



2.7.2 Global Plate Ids:

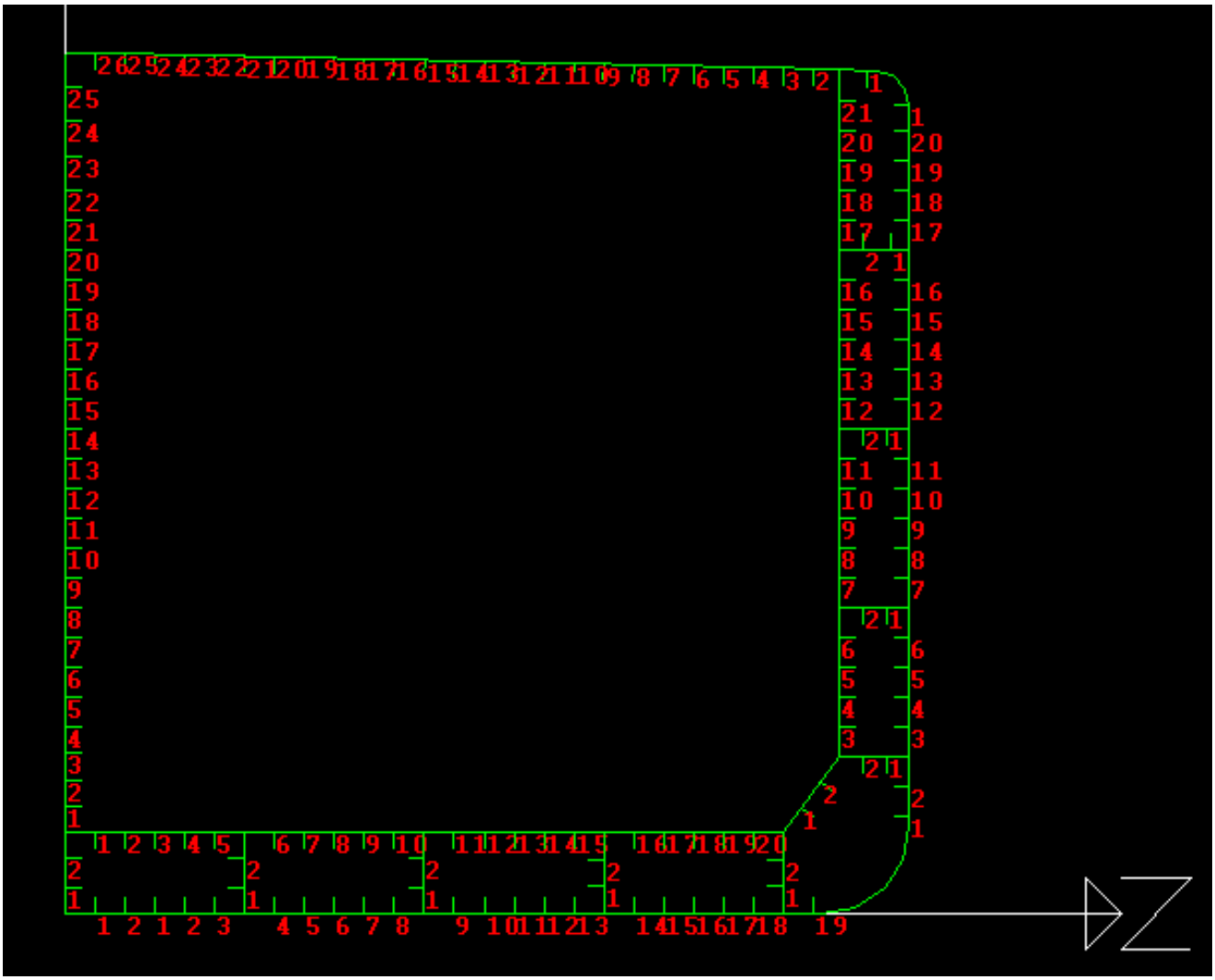


2.7.3 Plate:

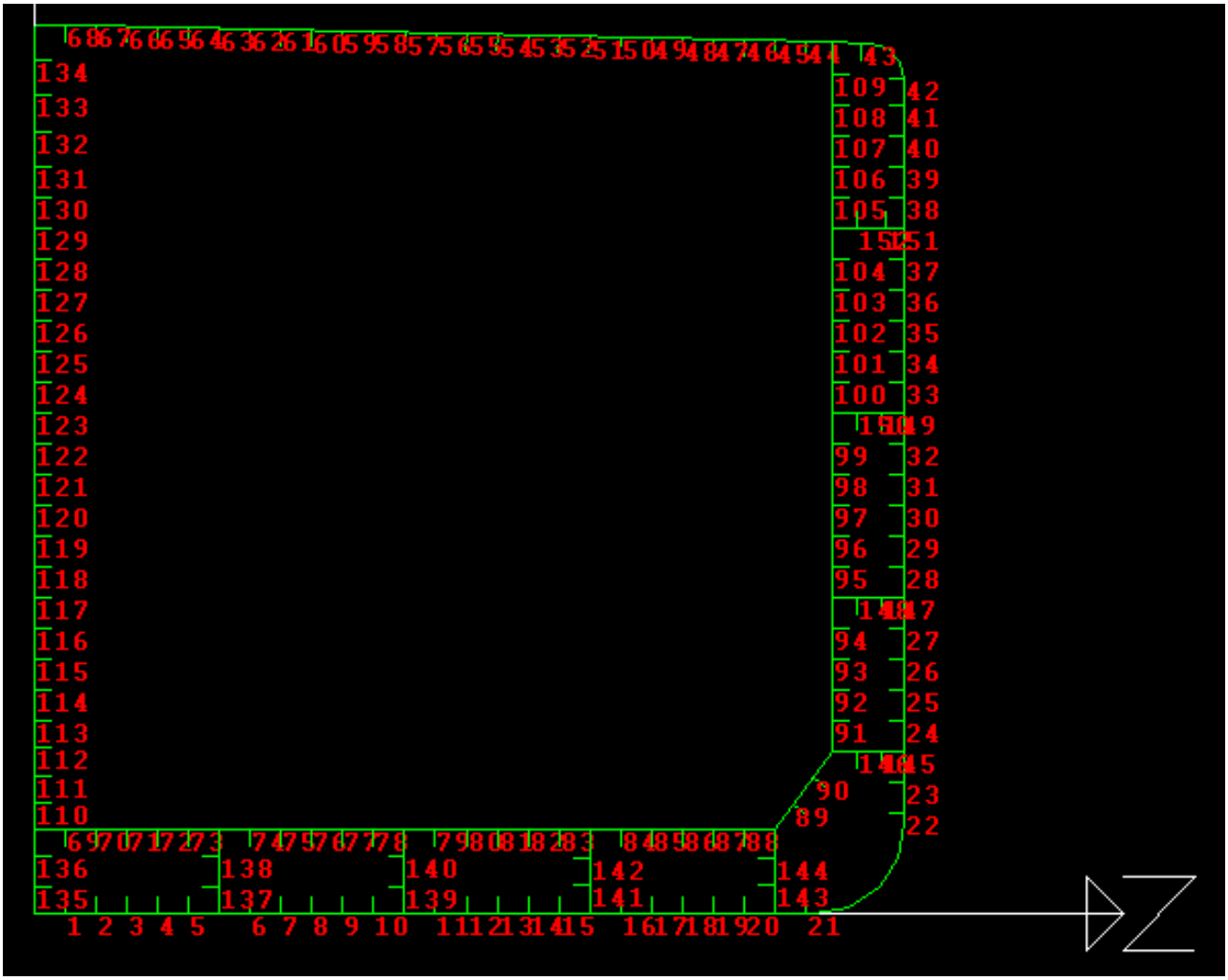
SEQ NO	ID	DESCRIPTION	B m	THK cm	CORROSION (mm)	A cm2	SPACING (m)	MATID	START NODE X-COORD (METER)	START NODE Y-COORD (METER)	END NODE X-COORD (METER)	END NODE Y-COORD (METER)
1	KPL-01	KEEL PLATE	1.8	1.9	1	342	0.85	2	0	0	1.8	0
2	BTM-01	BOTTOM	3.3	1.7	1	561	0.85	2	1.8	0	5.1	0
3	BTM-02	BOTTOM	5.1	1.7	1	867	0.85	2	5.1	0	10.2	0
4	BTM-03	BOTTOM	5.1	1.7	1	867	0.85	2	10.2	0	15.3	0
5	BTM-04	BOTTOM	5.1	1.7	1	867	0.85	2	15.3	0	20.4	0
6	BTM-05	BOTTOM	1.1	1.7	1	187	0.85	2	20.4	0	21.5	0
7	BLG-01	BILGE	0.976	1.7	1	165.87	2.201	2	21.5	0	22.457	0.19
8	BLG-02	BILGE	0.975	1.7	1	165.82	2.927	2	22.457	0.19	23.268	0.732
9	BLG-03	BILGE	0.975	1.7	1	165.82	2.927	2	23.268	0.732	23.81	1.543
10	BLG-04	BILGE	0.976	1.7	1	165.87	2.201	2	23.81	1.543	24	2.5
11	BLG-05	BILGE	0.1	1.7	1	17	1.226	2	24	2.5	24	2.6
12	SHL-01	SIDE	1.85	1.7	1.5	314.5	0.85	2	24	2.6	24	4.45
13	SHL-02	SIDE	4.25	1.8	1.5	765	0.85	1	24	4.45	24	8.7
14	SHL-03	SIDE	5.1	1.8	1.5	918	0.85	1	24	8.7	24	13.8
15	SHL-04	SIDE	5.1	1.8	1.5	918	0.85	1	24	13.8	24	18.9
16	SHL-05	SIDE	1.45	1.8	1.5	261	0.85	1	24	18.9	24	20.35
17	SHL-06	SIDE	2.55	2	1.5	510	0.85	2	24	20.35	24	22.9
18	GWR-01	GUNWALE	0.1	2	2	20	0.7	2	24	22.9	24	23
19	GWR-02	GUNWALE	0.518	2	2	103.53	0.518	2	24	23	23.866	23.5
20	GWR-03	GUNWALE	0.518	2	2	103.52	0.518	2	23.866	23.5	23.5	23.866
21	GWR-04	GUNWALE	0.518	2	2	103.53	0.718	2	23.5	23.866	23	24
22	GWR-05	GUNWALE	0.15	2	2	30.01	0.718	2	23	24	22.85	24.003
23	DEC-01	UPPER DECK	0.85	2	2	170.05	0.8	2	22.85	24.003	22	24.023
24	DEC-02	UPPER DECK	20.805	1.9	1	3953.04	0.855	2	22	24.023	1.2	24.5
25	DEC-03	UPPER DECK	1.2	1.9	1	228	0.855	2	1.2	24.5	0	24.5
26	INB-01	INNER BOTTOM	5.1	1.7	1.5	867	0.85	2	0	2.3	5.1	2.3
27	INB-02	INNER BOTTOM	5.1	1.7	1.5	867	0.85	2	5.1	2.3	10.2	2.3
28	INB-03	INNER BOTTOM	5.1	1.7	1.5	867	0.85	2	10.2	2.3	15.3	2.3
29	INB-04	INNER BOTTOM	5.1	1.7	1.5	867	0.85	2	15.3	2.3	20.4	2.3
30	INS-01	I.S. BULKHEAD	2.68	2	1.5	536	0.9	2	20.4	2.3	22	4.45
31	INS-02	I.S. BULKHEAD	4.25	1.8	1.5	765	0.85	2	22	4.45	22	8.7
32	INS-03	I.S. BULKHEAD	5.1	1.9	1.5	969	0.85	1	22	8.7	22	13.8
33	INS-04	I.S. BULKHEAD	5.1	1.6	1.5	816	0.85	1	22	13.8	22	18.9
34	INS-05	I.S. BULKHEAD	1.45	1.65	1.5	239.25	0.85	1	22	18.9	22	20.35
35	INS-06	I.S. BULKHEAD	3.673	1.8	1.5	661.14	0.873	2	22	20.35	22	24.023
36	CTR-01	C.L. BULKHEAD	1.6	1.6	1	128	0.75	2	0	2.3	0	3.9
37	CTR-02	C.L. BULKHEAD	1.4	1.65	1	115.5	0.75	1	0	3.9	0	5.3
38	CTR-03	C.L. BULKHEAD	1.8	1.65	1	148.5	0.85	1	0	5.3	0	7.1
39	CTR-04	C.L. BULKHEAD	3.2	1.6	1	256	0.85	1	0	7.1	0	10.3
40	CTR-05	C.L. BULKHEAD	3.2	1.5	1	240	0.85	1	0	10.3	0	13.5
41	CTR-06	C.L. BULKHEAD	6.4	1.5	1	480	0.85	1	0	13.5	0	19.9
42	CTR-07	C.L. BULKHEAD	4.6	1.8	1	414	0.975	2	0	19.9	0	24.5
43	BGR-01	W.T.BTM.GIRDER	2.3	1.8	2	207	0.8	2	0	0	0	2.3
44	NBG-01	N-TIGHT B. GDR	0.85	1.4	2	119	0.8	2	5.1	0	5.1	0.85
45	NBG-02	N-TIGHT B. GDR	0.6	0	2	0	0.8	2	5.1	0.85	5.1	1.45

46	NBG-03	N-TIGHT B. GDR	0.85	1.4	2	119	0.8	2	5.1	1.45	5.1	2.3
47	NBG-04	N-TIGHT B. GDR	0.85	1.4	2	119	0.8	2	10.2	0	10.2	0.85
48	NBG-05	N-TIGHT B. GDR	0.6	0	2	0	0.8	2	10.2	0.85	10.2	1.45
49	NBG-06	N-TIGHT B. GDR	0.85	1.4	2	119	0.8	2	10.2	1.45	10.2	2.3
50	NBG-07	N-TIGHT B. GDR	0.85	1.5	2	127.5	0.8	2	15.3	0	15.3	0.85
51	NBG-08	N-TIGHT B. GDR	0.6	0	2	0	0.7	2	15.3	0.85	15.3	1.45
52	NBG-09	N-TIGHT B. GDR	0.85	1.5	2	127.5	0.8	2	15.3	1.45	15.3	2.3
53	NBG-10	N-TIGHT B. GDR	0.85	1.5	2	127.5	0.8	2	20.4	0	20.4	0.85
54	NBG-11	N-TIGHT B. GDR	0.6	0	2	0	0.7	2	20.4	0.85	20.4	1.45
55	NBG-12	N-TIGHT B. GDR	0.85	1.5	2	127.5	0.8	2	20.4	1.45	20.4	2.3
56	NTS-01	NON-TIGHT STR	0.7	1.2	2	84	0.7	1	24	4.45	23.3	4.45
57	NTS-02	NON-TIGHT STR	0.6	0	2	0	0.7	1	23.3	4.45	22.7	4.45
58	NTS-03	NON-TIGHT STR	0.7	1.2	2	84	0.7	1	22.7	4.45	22	4.45
59	NTS-04	NON-TIGHT STR	0.7	1.2	2	84	0.7	1	24	8.7	23.3	8.7
60	NTS-05	NON-TIGHT STR	0.6	0	2	0	0.7	1	23.3	8.7	22.7	8.7
61	NTS-06	NON-TIGHT STR	0.7	1.2	2	84	0.7	1	22.7	8.7	22	8.7
62	NTS-07	NON-TIGHT STR	0.7	1.2	2	84	0.7	1	24	13.8	23.3	13.8
63	NTS-08	NON-TIGHT STR	0.6	0	2	0	0.7	1	23.3	13.8	22.7	13.8
64	NTS-09	NON-TIGHT STR	0.7	1.2	2	84	0.7	1	22.7	13.8	22	13.8
65	NTS-10	NON-TIGHT STR	0.6	1.2	2	72	0.8	1	24	18.9	23.4	18.9
66	NTS-11	NON-TIGHT STR	0.7	0	2	0	0.8	1	23.4	18.9	22.7	18.9
67	NTS-12	NON-TIGHT STR	0.7	1.2	2	84	0.8	1	22.7	18.9	22	18.9

2.7.4 Local Stiffener Ids:



2.7.5 Global Stiffener IDs:



2.7.6 Stiffeners:

ID	SID	XLB	A	STFSP	MATID
			cm2	(m)	
KPL- 101	15	400x120x11.5x23 LIA	71.6	0.85	2
KPL- 102	15	400x120x11.5x23 LIA	71.6	0.85	2
BTM- 101	15	400x120x11.5x23 LIA	71.6	0.85	2
BTM- 102	15	400x120x11.5x23 LIA	71.6	0.85	2
BTM- 103	15	400x120x11.5x23 LIA	71.6	0.85	2
BTM- 204	15	400x120x11.5x23 LIA	71.6	0.85	2
BTM- 205	15	400x120x11.5x23 LIA	71.6	0.85	2
BTM- 206	15	400x120x11.5x23 LIA	71.6	0.85	2
BTM- 207	15	400x120x11.5x23 LIA	71.6	0.85	2
BTM- 208	15	400x120x11.5x23 LIA	71.6	0.85	2
BTM- 309	15	400x120x11.5x23 LIA	71.6	0.85	2

BTM- 310	15	400x120x11.5x23 LIA	71.6	0.85	2
BTM- 311	15	400x120x11.5x23 LIA	71.6	0.85	2
BTM- 312	15	400x120x11.5x23 LIA	71.6	0.85	2
BTM- 313	15	400x120x11.5x23 LIA	71.6	0.85	2
BTM- 414	15	400x120x11.5x23 LIA	71.6	0.85	2
BTM- 415	15	400x120x11.5x23 LIA	71.6	0.85	2
BTM- 416	15	400x120x11.5x23 LIA	71.6	0.85	2
BTM- 417	15	400x120x11.5x23 LIA	71.6	0.85	2
BTM- 418	15	400x120x11.5x23 LIA	71.6	0.85	2
BTM- 519	15	400x120x11.5x23 LIA	71.6	0.85	2
SHL- 101	12	350x120x11.5x18 LIA	60.42	0.85	2
SHL- 102	12	350x120x11.5x18 LIA	60.42	0.85	2
SHL- 203	12	350x120x11.5x18 LIA	60.42	0.85	2
SHL- 204	12	350x120x11.5x18 LIA	60.42	0.85	2
SHL- 205	12	350x120x11.5x18 LIA	60.42	0.85	1
SHL- 206	11	350x120x10.5x16 LIA	54.91	0.85	1
SHL- 307	11	350x120x10.5x16 LIA	54.91	0.85	1
SHL- 308	9	325x120x10.5x14 LIA	50.1	0.85	1
SHL- 309	9	325x120x10.5x14 LIA	50.1	0.85	1
SHL- 310	9	325x120x10.5x14 LIA	50.1	0.85	1
SHL- 311	9	325x120x10.5x14 LIA	50.1	0.85	1
SHL- 412	7	300x100x10.5x15 LIA	45.29	0.85	1
SHL- 413	7	300x100x10.5x15 LIA	45.29	0.85	1
SHL- 414	7	300x100x10.5x15 LIA	45.29	0.85	1
SHL- 415	7	300x100x10.5x15 LIA	45.29	0.85	1
SHL- 416	7	300x100x10.5x15 LIA	45.29	0.85	1
SHL- 517	7	300x100x10.5x15 LIA	45.29	0.85	1
SHL- 618	7	300x100x10.5x15 LIA	45.29	0.85	1
SHL- 619	5	250x90x11.5x16 LIA	41.67	0.85	2
SHL- 620	5	250x90x11.5x16 LIA	41.67	0.85	2
GWR- 101	5	250x90x11.5x16 LIA	41.67	0.05	2
DEC- 101	22	FB 400x28	112	0.425	2
DEC- 202	22	FB 400x28	112	0.8	2
DEC- 203	22	FB 400x28	112	0.85	2
DEC- 204	22	FB 400x28	112	0.85	2
DEC- 205	22	FB 400x28	112	0.85	2
DEC- 206	22	FB 400x28	112	0.85	2
DEC- 207	22	FB 400x28	112	0.85	2
DEC- 208	22	FB 400x28	112	0.85	2
DEC- 209	22	FB 400x28	112	0.85	2
DEC- 210	22	FB 400x28	112	0.85	2
DEC- 211	22	FB 400x28	112	0.85	2
DEC- 212	22	FB 400x28	112	0.85	2
DEC- 213	22	FB 400x28	112	0.85	2
DEC- 214	22	FB 400x28	112	0.85	2
DEC- 215	22	FB 400x28	112	0.85	2
DEC- 216	22	FB 400x28	112	0.85	2
DEC- 217	22	FB 400x28	112	0.85	2
DEC- 218	22	FB 400x28	112	0.85	2
DEC- 219	22	FB 400x28	112	0.85	2
DEC- 220	22	FB 400x28	112	0.85	2
DEC- 221	22	FB 400x28	112	0.85	2

DEC- 222	**22**	**FB 400x28**	**112**	**0.85**	**2**
DEC- 223	**22**	**FB 400x28**	**112**	**0.85**	**2**
DEC- 224	**22**	**FB 400x28**	**112**	**0.85**	**2**
DEC- 225	**22**	**FB 400x28**	**112**	**1.103**	**2**
DEC- 326	**22**	**FB 400x28**	**112**	**0.6**	**2**
INB- 101	**15**	**400x120x11.5x23 LIA**	**71.6**	**0.85**	**2**
INB- 102	**15**	**400x120x11.5x23 LIA**	**71.6**	**0.85**	**2**
INB- 103	**15**	**400x120x11.5x23 LIA**	**71.6**	**0.85**	**2**
INB- 104	**15**	**400x120x11.5x23 LIA**	**71.6**	**0.85**	**2**
INB- 105	**15**	**400x120x11.5x23 LIA**	**71.6**	**0.85**	**2**
INB- 206	**15**	**400x120x11.5x23 LIA**	**71.6**	**0.85**	**2**
INB- 207	**15**	**400x120x11.5x23 LIA**	**71.6**	**0.85**	**2**
INB- 208	**15**	**400x120x11.5x23 LIA**	**71.6**	**0.85**	**2**
INB- 209	**15**	**400x120x11.5x23 LIA**	**71.6**	**0.85**	**2**
INB- 210	**15**	**400x120x11.5x23 LIA**	**71.6**	**0.85**	**2**
INB- 311	**15**	**400x120x11.5x23 LIA**	**71.6**	**0.85**	**2**
INB- 312	**15**	**400x120x11.5x23 LIA**	**71.6**	**0.85**	**2**
INB- 313	**15**	**400x120x11.5x23 LIA**	**71.6**	**0.85**	**2**
INB- 314	**15**	**400x120x11.5x23 LIA**	**71.6**	**0.85**	**2**
INB- 315	**15**	**400x120x11.5x23 LIA**	**71.6**	**0.85**	**2**
INB- 416	**15**	**400x120x11.5x23 LIA**	**71.6**	**0.85**	**2**
INB- 417	**15**	**400x120x11.5x23 LIA**	**71.6**	**0.85**	**2**
INB- 418	**15**	**400x120x11.5x23 LIA**	**71.6**	**0.85**	**2**
INB- 419	**15**	**400x120x11.5x23 LIA**	**71.6**	**0.85**	**2**
INB- 420	**15**	**400x120x11.5x23 LIA**	**71.6**	**0.85**	**2**
INS- 101	**13**	**375x120x10.5x18 LIA**	**59.73**	**0.895**	**2**
INS- 102	**13**	**375x120x10.5x18 LIA**	**59.73**	**0.895**	**2**
INS- 203	**13**	**375x120x10.5x18 LIA**	**59.73**	**0.85**	**2**
INS- 204	**13**	**375x120x10.5x18 LIA**	**59.73**	**0.85**	**2**
INS- 205	**12**	**350x120x11.5x18 LIA**	**60.42**	**0.85**	**1**
INS- 206	**12**	**350x120x11.5x18 LIA**	**60.42**	**0.85**	**1**
INS- 307	**11**	**350x120x10.5x16 LIA**	**54.91**	**0.85**	**1**
INS- 308	**11**	**350x120x10.5x16 LIA**	**54.91**	**0.85**	**1**
INS- 309	**11**	**350x120x10.5x16 LIA**	**54.91**	**0.85**	**1**
INS- 310	**11**	**350x120x10.5x16 LIA**	**54.91**	**0.85**	**1**
INS- 311	**11**	**350x120x10.5x16 LIA**	**54.91**	**0.85**	**1**
INS- 412	**11**	**350x120x10.5x16 LIA**	**54.91**	**0.85**	**1**
INS- 413	**11**	**350x120x10.5x16 LIA**	**54.91**	**0.85**	**1**
INS- 414	**7**	**300x100x10.5x15 LIA**	**45.29**	**0.85**	**1**
INS- 415	**7**	**300x100x10.5x15 LIA**	**45.29**	**0.85**	**1**
INS- 416	**7**	**300x100x10.5x15 LIA**	**45.29**	**0.85**	**1**
INS- 517	**7**	**300x100x10.5x15 LIA**	**45.29**	**0.85**	**1**
INS- 618	**7**	**300x100x10.5x15 LIA**	**45.29**	**0.85**	**1**
INS- 619	**7**	**300x100x10.5x15 LIA**	**45.29**	**0.85**	**1**
INS- 620	**7**	**300x100x10.5x15 LIA**	**45.29**	**0.85**	**1**
INS- 621	**7**	**300x100x10.5x15 LIA**	**45.29**	**0.862**	**1**
CTR- 101	**11**	**350x120x10.5x16 LIA**	**27.46**	**0.75**	**2**
CTR- 102	**11**	**350x120x10.5x16 LIA**	**27.46**	**0.75**	**2**
CTR- 203	**11**	**350x120x10.5x16 LIA**	**27.46**	**0.75**	**1**
CTR- 204	**11**	**350x120x10.5x16 LIA**	**27.46**	**0.8**	**1**
CTR- 305	**11**	**350x120x10.5x16 LIA**	**27.46**	**0.85**	**1**
CTR- 306	**11**	**350x120x10.5x16 LIA**	**27.46**	**0.85**	**1**

CTR- 407	**11**	**350x120x10.5x16 LIA**	**27.46**	**0.85**	**1**
CTR- 408	**11**	**350x120x10.5x16 LIA**	**27.46**	**0.85**	**1**
CTR- 409	**11**	**350x120x10.5x16 LIA**	**27.46**	**0.85**	**1**
CTR- 510	**11**	**350x120x10.5x16 LIA**	**27.46**	**0.85**	**1**
CTR- 511	**9**	**325x120x10.5x14 LIA**	**25.05**	**0.85**	**1**
CTR- 512	**9**	**325x120x10.5x14 LIA**	**25.05**	**0.85**	**1**
CTR- 513	**9**	**325x120x10.5x14 LIA**	**25.05**	**0.85**	**1**
CTR- 614	**9**	**325x120x10.5x14 LIA**	**25.05**	**0.85**	**1**
CTR- 615	**9**	**325x120x10.5x14 LIA**	**25.05**	**0.85**	**1**
CTR- 616	**9**	**325x120x10.5x14 LIA**	**25.05**	**0.85**	**1**
CTR- 617	**9**	**325x120x10.5x14 LIA**	**25.05**	**0.85**	**1**
CTR- 618	**9**	**325x120x10.5x14 LIA**	**25.05**	**0.85**	**1**
CTR- 619	**9**	**325x120x10.5x14 LIA**	**25.05**	**0.85**	**1**
CTR- 620	**5**	**250x90x11.5x16 LIA**	**20.84**	**0.85**	**1**
CTR- 621	**5**	**250x90x11.5x16 LIA**	**20.84**	**0.85**	**1**
CTR- 722	**5**	**250x90x11.5x16 LIA**	**20.84**	**0.912**	**1**
CTR- 723	**5**	**250x90x11.5x16 LIA**	**20.84**	**0.975**	**2**
CTR- 724	**5**	**250x90x11.5x16 LIA**	**20.84**	**0.975**	**2**
CTR- 725	**5**	**250x90x11.5x16 LIA**	**20.84**	**0.975**	**2**
BGR- 101	**13**	**375x120x10.5x18 LIA**	**29.86**	**0.775**	**2**
BGR- 102	**12**	**350x120x11.5x18 LIA**	**30.21**	**0.775**	**2**
NBG- 101	**3**	**250x90x9x13 LIA**	**33.39**	**1.1**	**2**
NBG- 302	**3**	**250x90x9x13 LIA**	**33.39**	**0.425**	**2**
NBG- 403	**3**	**250x90x9x13 LIA**	**33.39**	**1.1**	**2**
NBG- 604	**3**	**250x90x9x13 LIA**	**33.39**	**0.425**	**2**
NBG- 705	**3**	**250x90x9x13 LIA**	**33.39**	**0.75**	**2**
NBG- 906	**3**	**250x90x9x13 LIA**	**33.39**	**0.75**	**2**
NBG-1007	**3**	**250x90x9x13 LIA**	**33.39**	**0.75**	**2**
NBG-1208	**3**	**250x90x9x13 LIA**	**33.39**	**0.75**	**2**
NTS- 101	**3**	**250x90x9x13 LIA**	**33.39**	**0.975**	**1**
NTS- 302	**3**	**250x90x9x13 LIA**	**33.39**	**0.35**	**1**
NTS- 403	**3**	**250x90x9x13 LIA**	**33.39**	**0.975**	**1**
NTS- 604	**3**	**250x90x9x13 LIA**	**33.39**	**0.35**	**1**
NTS- 705	**3**	**250x90x9x13 LIA**	**33.39**	**0.975**	**1**
NTS- 906	**3**	**250x90x9x13 LIA**	**33.39**	**0.35**	**1**
NTS-1007	**0**	**250x90x9x13 LIA**	**33.39**	**0.975**	**1**
NTS-1208	**0**	**250x90x9x13 LIA**	**33.39**	**0.35**	**1**

B.2 100,000 DWT SINGLE HULL TANKER

100k dwt Single Hull Tanker

from Kuroiwa (1996)

Information Book

For

Grounding and Collision Analysis

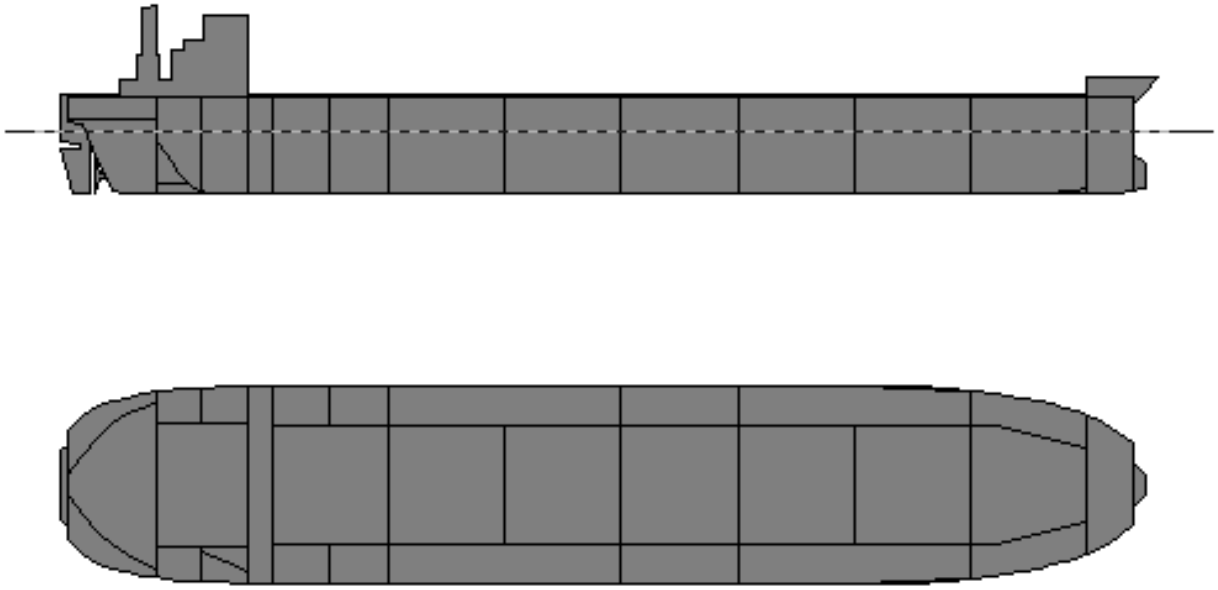
Update: October 31, 1999

A. J. Brown

Chapter 1 Naval Architecture

L = 222 m **B = 42 m** **D = 20.3 m** **T = 13.35 m** **Δ = 111015 MT**

1.1 PROFILE AND PLAN



1.2 WEIGHTS AND STABILITY

FullLoadDepart

Item	Weight MT	VCG m	LCG m-MS	TCG m-CL	FSMom m-MT
Light Ship	14,723	12.000	10.817A	0.000	----
Constant	300	14.000	80.000A	0.000	----
Cargo Oil	92,537	10.323	9.935F	0.000P	128,072
Fuel Oil	2,196	11.770	79.691A	0.000	778
Fresh Water	1,258	14.797	89.229A	0.000	0
SW Ballast	0	----	----	----	----
Misc. Weights	0	----	----	----	----
Displacement	111,015	10.635	4.042F	0.000S	128,850

Stability Calculation			Trim Calculation		
KMt	17.125	m	LCF Draft	13.350	m
VCG	10.635	m	LCB (even keel)	4.042F	m-MS
GMt (Solid)	6.490	m	LCF	2.261F	m-MS
FSc	1.161	m	MT1cm	1,335	m-MT
GMt (Corrected)	5.330	m	Trim	0.000	m
			List	0.0	deg

Drafts			Strength Calculations		
Draft at A.P.	13.350	m	Shear	0	MT at 0.000 m-MS
Draft at M.S.	13.350	m	Bending Moment	0	m-MT at 0.000 m-MS

1.3 PRIMARY SUBDIVISION

Cargo Block Longitudinal Bulkheads – 12.5 m from CL (CO-CUB-S and P)

	Compartment	Mir	# Sta	Aft m-MS	Fwd m-MS	Port m	Stbd m	Lower m	Upper m
1	FOREPEAK	N	7	105.000F	115.000F	HULL	HULL	HULL	HULL
2	NO.1 WBT S	N	11	80.000F	105.000F	CO-CUB-S	HULL	HULL	HULL
3	NO.1 COT C	N	11	80.000F	105.000F	CO-CUB-P	CO-CUB-S	HULL	HULL
4	NO.1 WBT P	N	11	80.000F	105.000F	HULL	CO-CUB-P	HULL	HULL
5	NO.2 WBT S	N	11	30.000F	80.000F	CO-CUB-S	HULL	HULL	HULL
6	NO.2 COT C	N	11	55.000F	80.000F	CO-CUB-P	CO-CUB-S	HULL	HULL
7	NO.2 WBT P	N	11	30.000F	80.000F	HULL	CO-CUB-P	HULL	HULL
8	NO.3 COT C	N	3	30.000F	55.000F	CO-CUB-P	CO-CUB-S	HULL	HULL
9	NO.4 COT S	N	3	5.000F	30.000F	CO-CUB-S	HULL	HULL	HULL
10	NO.4 COT C	N	3	5.000F	30.000F	CO-CUB-P	CO-CUB-S	HULL	HULL
11	NO.4 COT P	N	3	5.000F	30.000F	HULL	CO-CUB-P	HULL	HULL
12	NO.5 COT C	N	3	20.000A	5.000F	CO-CUB-P	CO-CUB-S	HULL	HULL
13	NO.4 WBT S	N	3	45.000A	5.000F	CO-CUB-S	HULL	HULL	HULL
14	NO.6 COT C	N	3	45.000A	20.000A	CO-CUB-P	CO-CUB-S	HULL	HULL

15	NO.4 WBT P	N	3	45.000A	5.000F	HULL	CO-CUB-P	HULL	HULL
16	NO.7 COT S	N	5	57.500A	45.000A	CO-CUB-S	HULL	HULL	HULL
17	NO.7 COT C	N	5	70.000A	45.000A	CO-CUB-P	CO-CUB-S	HULL	HULL
18	NO.7 COT P	N	5	57.500A	45.000A	HULL	CO-CUB-P	HULL	HULL
19	SLOP TANK S	N	3	70.000A	57.500A	CO-CUB-S	HULL	HULL	HULL
20	SLOP TANK P	N	3	70.000A	57.500A	HULL	CO-CUB-P	HULL	HULL
21	COFFERDAM	N	5	75.000A	70.000A	HULL	HULL	HULL	HULL
22	FO S	N	7	85.000A	75.000A	13.000S	HULL	HULL	HULL
23	ENGINE ROOM	N	7	95.000A	75.000A	13.000P	13.000S	2.000	HULL
24	ENG ROOM DB	N	5	95.000A	75.000A	HULL	HULL	HULL	2.000
25	FO P	N	7	85.000A	75.000A	HULL	13.000P	HULL	HULL
26	FRESH WTR S	N	5	95.000A	85.000A	13.000S	HULL	HULL	HULL
27	FRESH WTR P	N	5	95.000A	85.000A	HULL	13.000P	HULL	HULL
28	STRNG GEAR	N	7	114.000A	95.000A	HULL	HULL	16.000	HULL

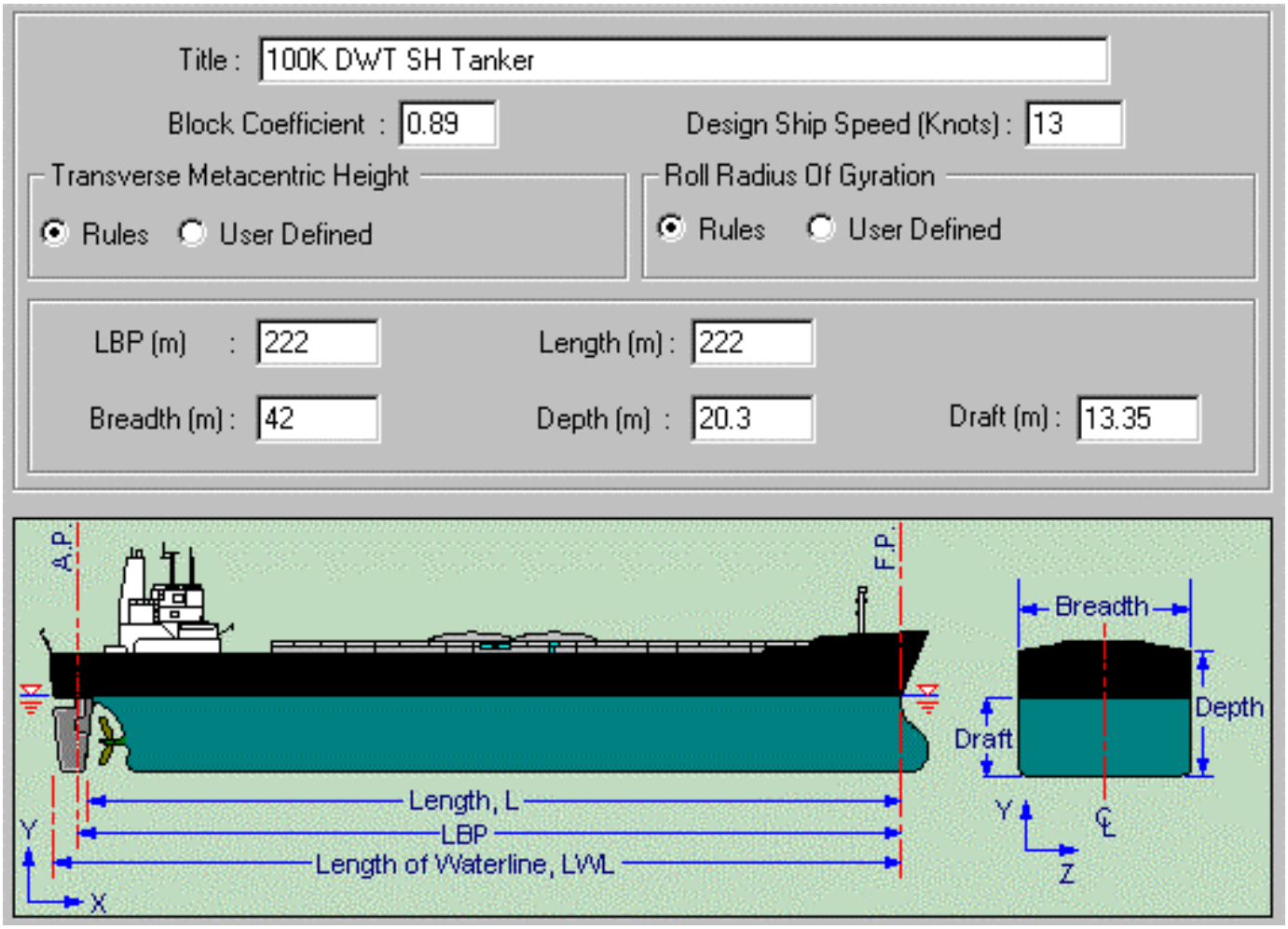
1.4 FULL LOAD CARGO

FullLoadDepart

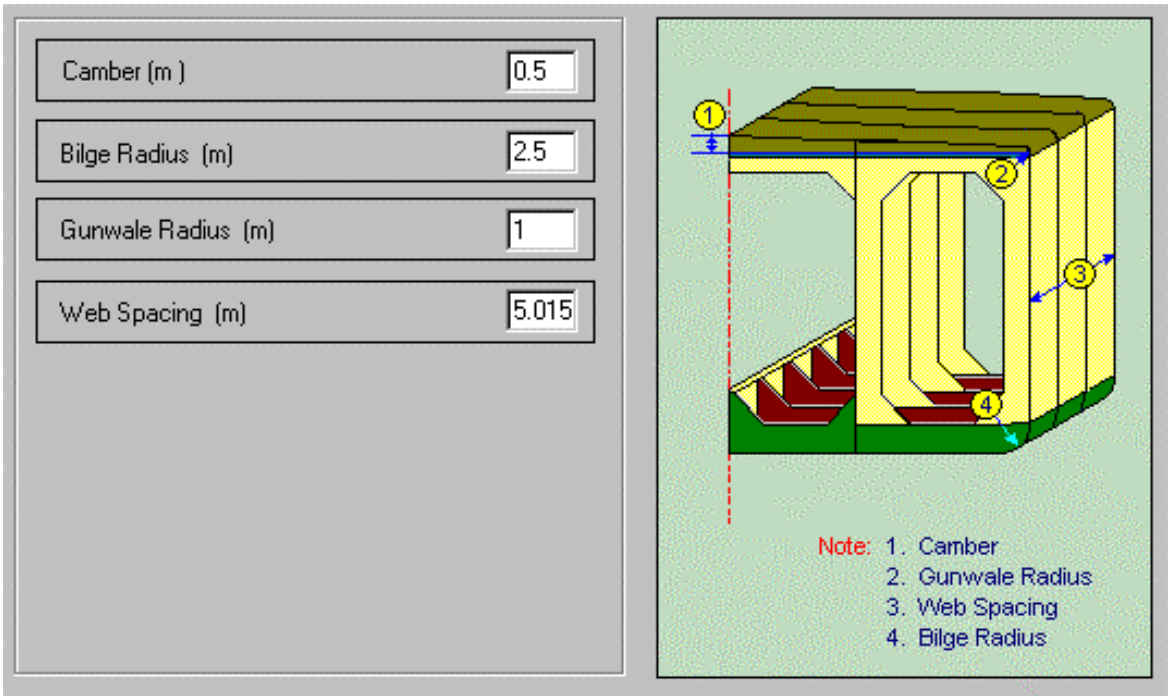
Cargo Oil	Weight	%	Capacity	VCG	LCG	TCG	FSmom	Density	Volume
Tank Name	MT	Full	MT	m-BL	m-MS	m-CL	m-MT	MT/m3	m3
NO.1 COT C	9,582	98.0	9,777	10.354	91.439F	0.000	13,010	0.9130	10,495
NO.2 COT C	11,316	98.0	11,547	10.330	67.500F	0.000	18,398	0.9130	12,394
NO.3 COT C	11,317	98.0	11,548	10.328	42.500F	0.000	18,394	0.9130	12,395
NO.4 COT S	3,789	98.0	3,867	10.230	17.500F	16.731S	1,173	0.9130	4,151
NO.4 COT C	11,318	98.0	11,549	10.328	17.500F	0.000	18,395	0.9130	12,396
NO.4 COT P	3,789	98.0	3,867	10.230	17.500F	16.731P	1,172	0.9130	4,151
NO.5 COT C	11,318	98.0	11,549	10.327	7.500A	0.000	18,396	0.9130	12,397
NO.6 COT C	11,318	98.0	11,549	10.328	32.500A	0.000	18,395	0.9130	12,397
NO.7 COT S	1,891	98.0	1,929	10.248	51.243A	16.722S	586	0.9130	2,071
NO.7 COT C	11,317	98.0	11,548	10.328	57.500A	0.000	18,395	0.9130	12,396
NO.7 COT P	1,891	98.0	1,929	10.248	51.243A	16.722P	586	0.9130	2,071
SLOP TANK S	1,845	98.0	1,883	10.424	63.690A	16.635S	586	0.9130	2,021
SLOP TANK P	1,845	98.0	1,883	10.424	63.690A	16.635P	586	0.9130	2,021
Totals	92,537	98.0	94,425	10.323	9.935F	0.000S	128,072		101,355

Chapter 2 Structural Design

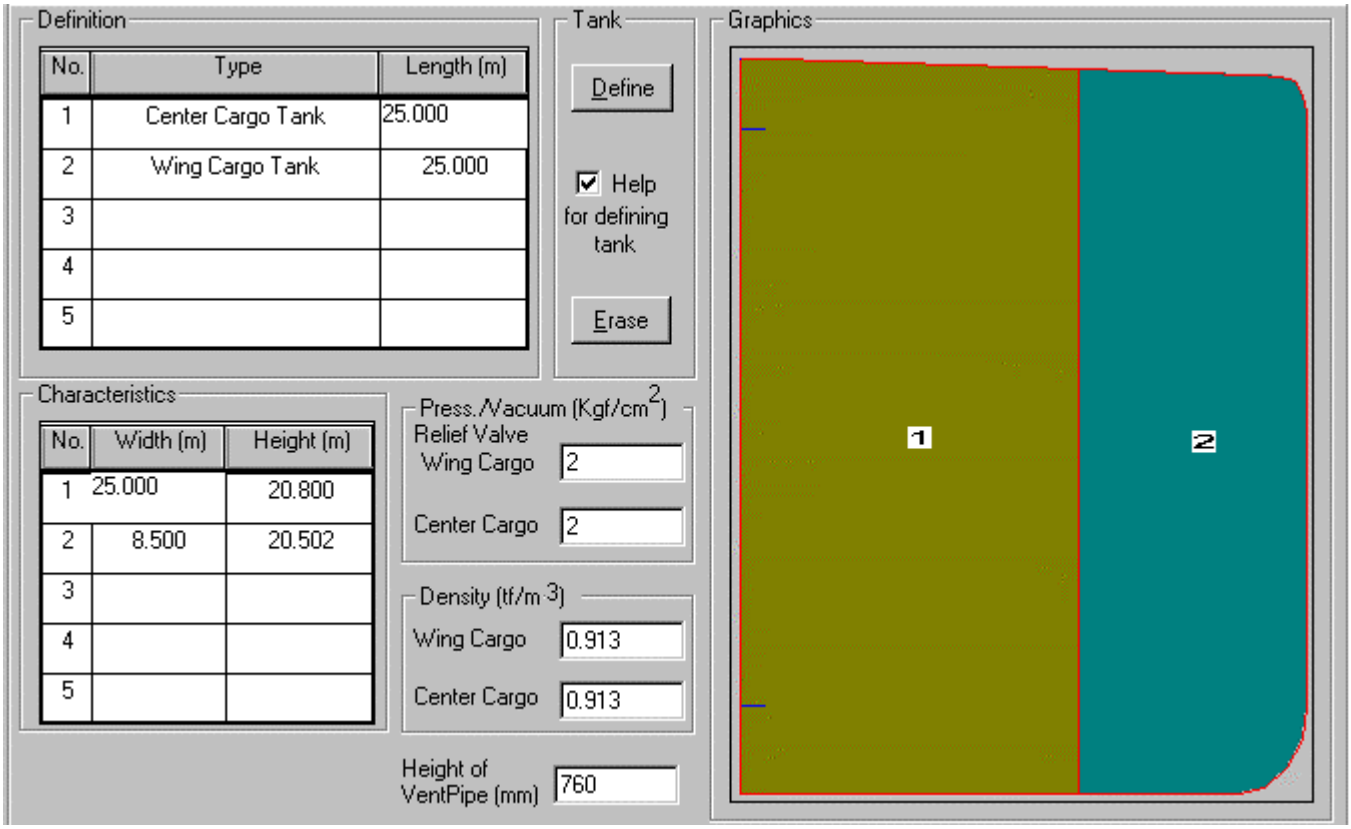
2.1 SHIP DIMENSIONS



2.2 MIDSHIP GEOMETRY

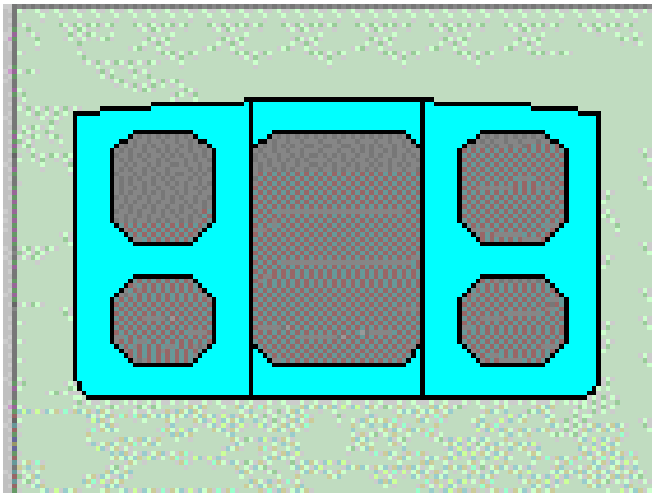


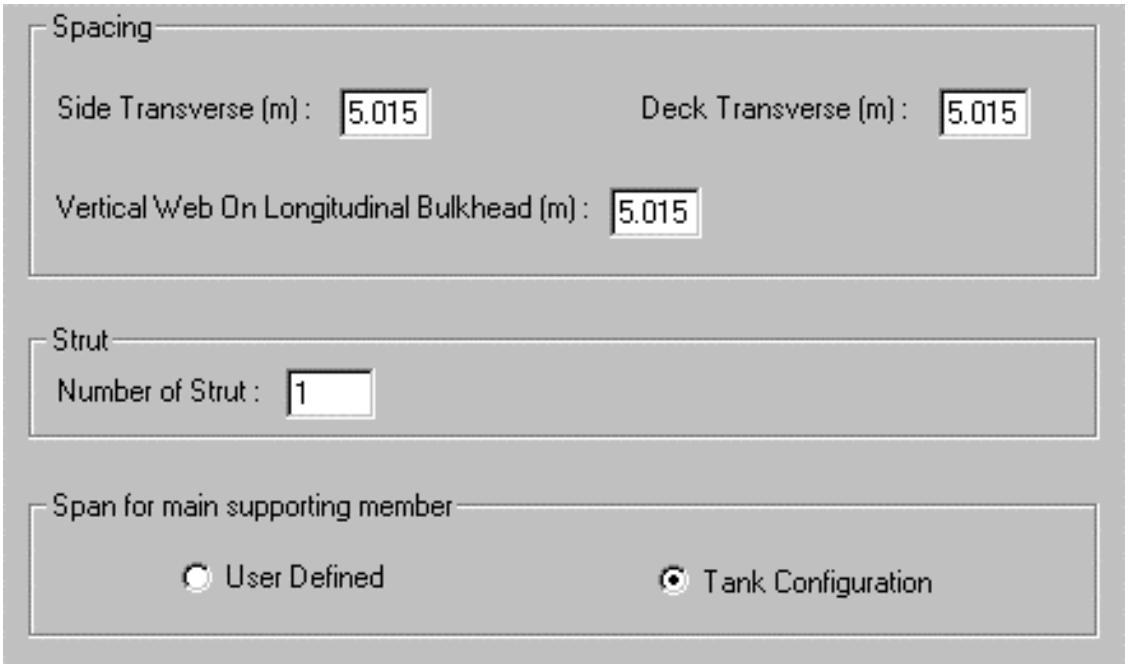
2.3 TANK DEFINITION



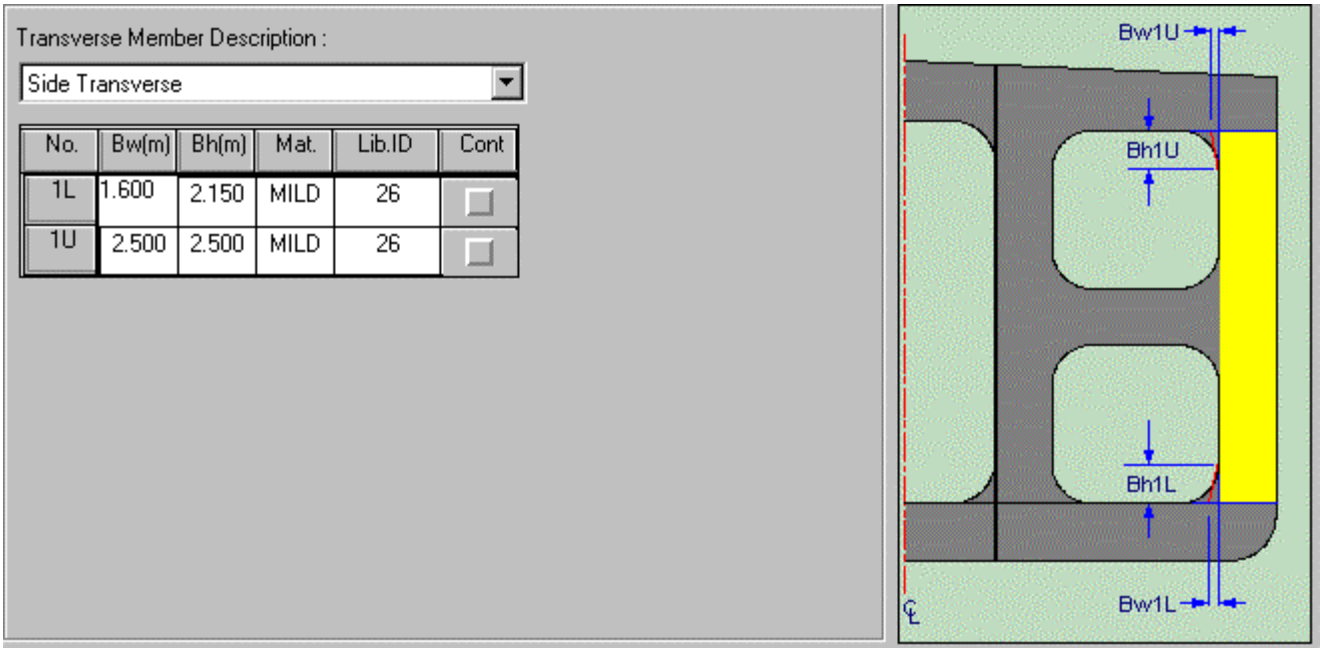
2.4 TRANSVERSE MEMBERS

2.4.1 Web Configuration





2.4.2 Main Supporting Members – Side Transverse (Web)



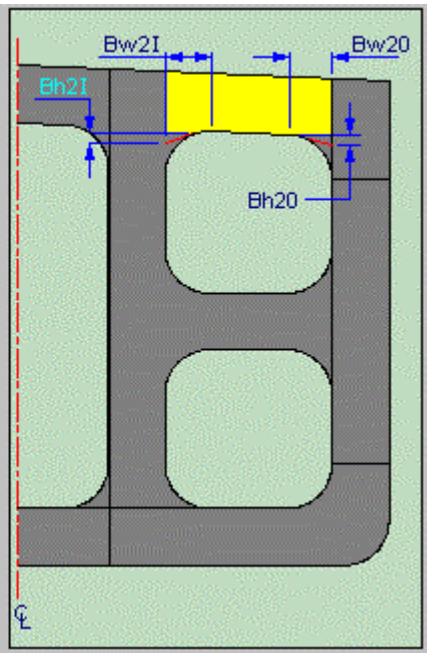
Web thickness: 15 mm

2.4.3 Main Supporting Members – Deck Transverse

Transverse Member Description :

Deck Transverse

No.	Bw(m)	Bh(m)	Mat.	Lib.ID	Width(mm)	Thick(mm)	Cont
2O	2.500	2.500	MILD	26	500.000	24.000	✖
2I	2.500	2.500	MILD	26	500.000	24.000	✖



Deck Transverse web thickness: 15 mm

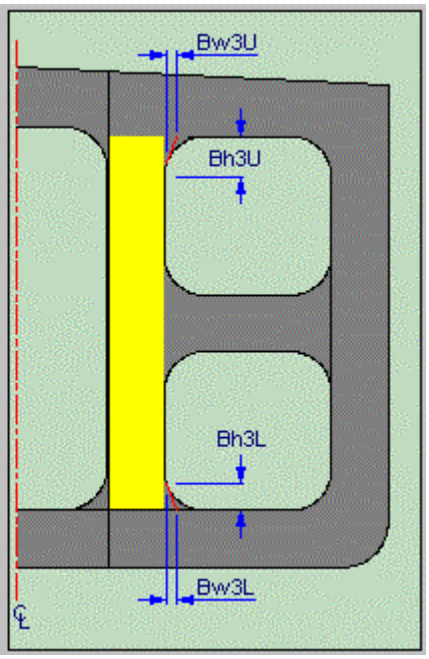
2.4.4 Main Supporting Members – Vertical Web on Longitudinal Bulkhead

Transverse Member Description :

Vertical Web on Longitudinal Bulkhead

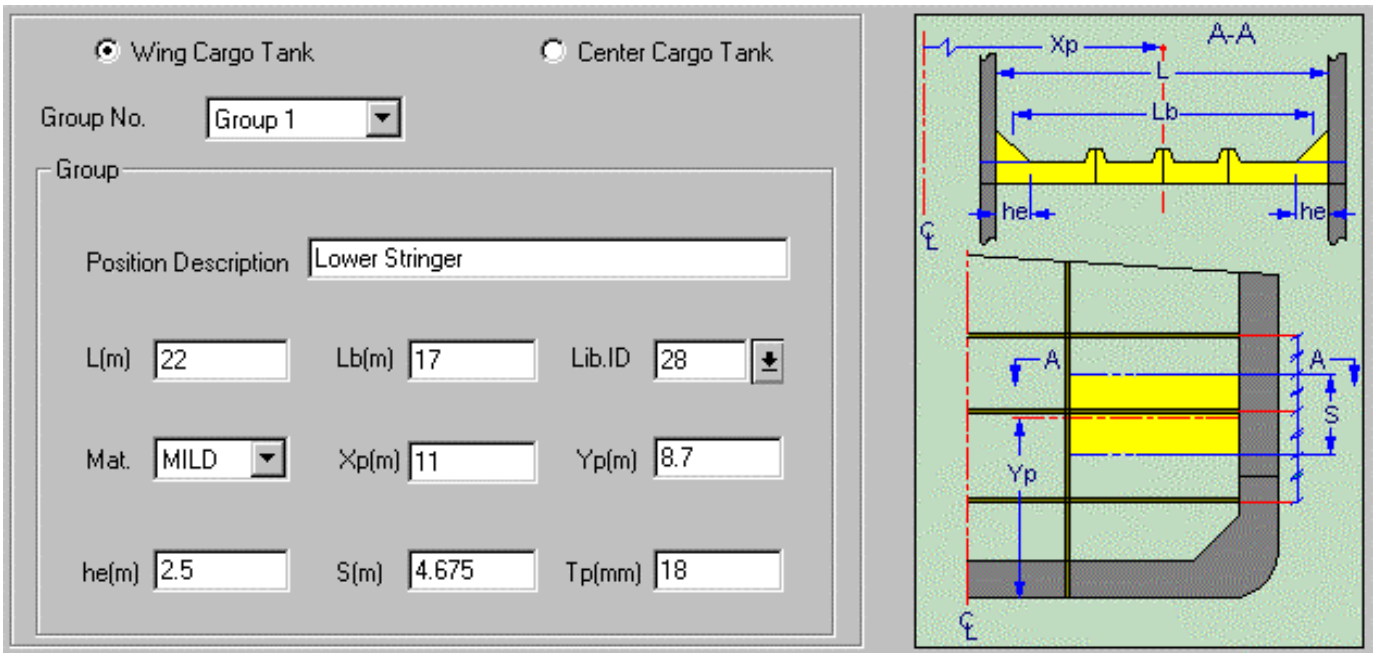
No.	Bw(m)	Bh(m)	Mat.	Lib.ID	Width(mm)	Thick(mm)	Cont
3L	2.500	2.500	MILD	26	500.000	24.000	✖
3U	2.500	2.500	MILD	26	500.000	24.000	✖

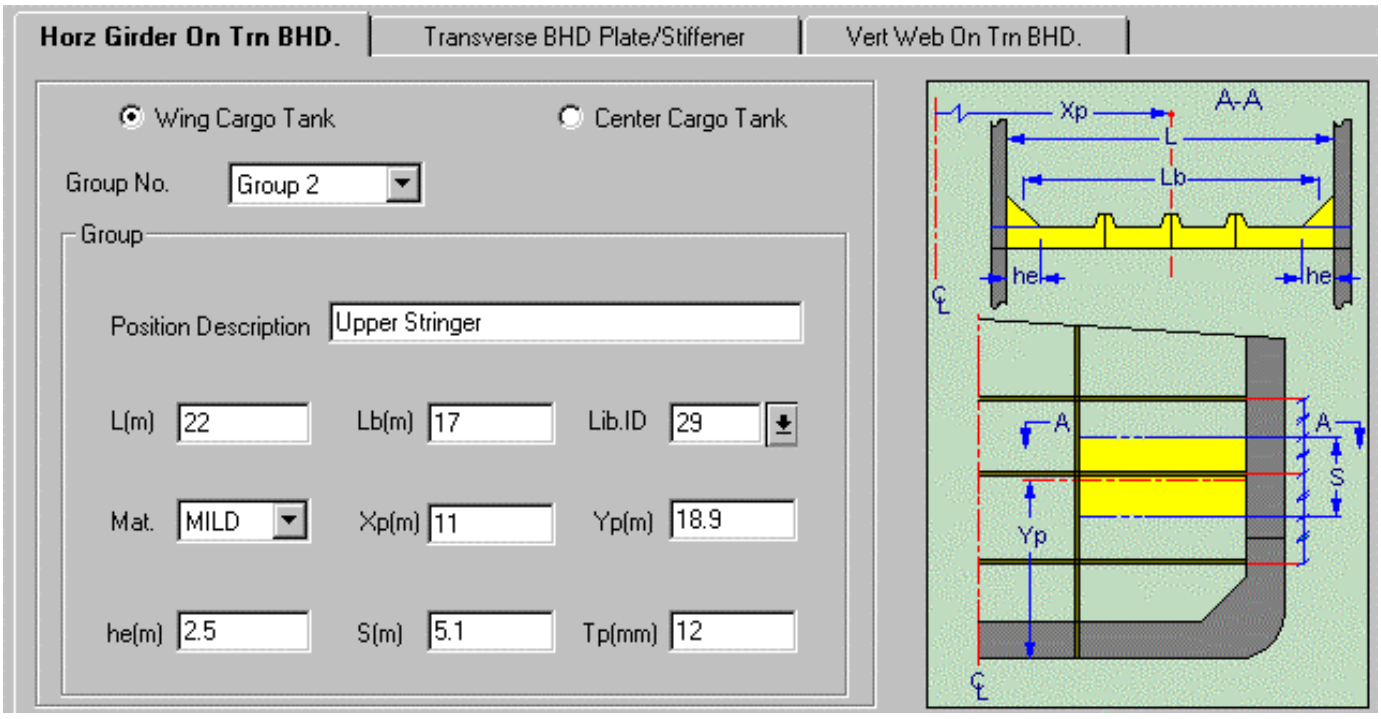
No.	Other Bh(m)	Other Bw(m)	Depth(m)
3L	2.500	2.500	
3U	2.500	2.500	2.500



Vertical Web thickness: 15mm

2.4.5 Transverse Bulkhead





Horz Girder On Trn BHD. | Transverse BHD Plate/Stiffener | Vert Web On Trn BHD.

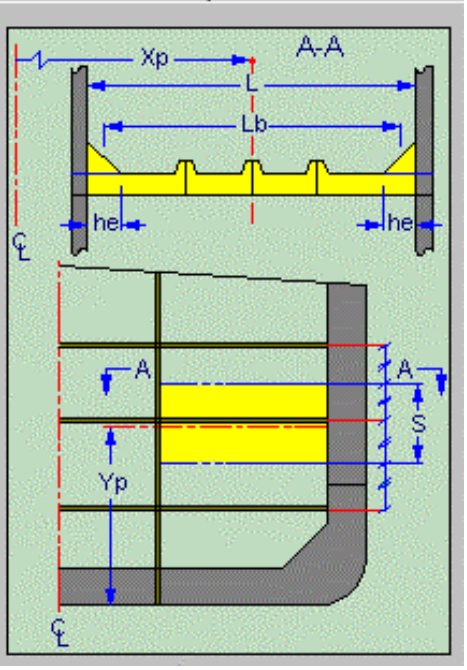
(•) Wing Cargo Tank ( ) Center Cargo Tank

Group No. Group 3

Group

Position Description: Stool Level

L(m)	22	Lb(m)	17	Lib.ID	28
Mat.	MILD	Xp(m)	11	Yp(m)	4.45
he(m)	2.5	S(m)	3.2	Tp(mm)	18



Horz Girder On Trn BHD. | Transverse BHD Plate/Stiffener | Vert Web On Trn BHD.

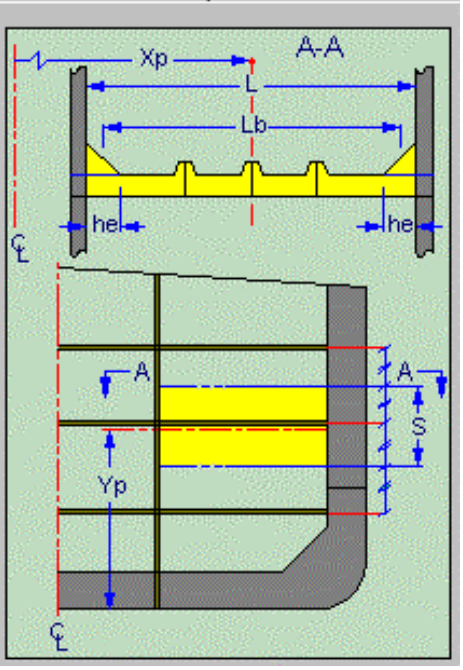
(•) Wing Cargo Tank ( ) Center Cargo Tank

Group No. Group 4

Group

Position Description: Middle Stringer

L(m)	22	Lb(m)	17	Lib.ID	28
Mat.	MILD	Xp(m)	11	Yp(m)	13.8
he(m)	2.5	S(m)	5.1	Tp(mm)	14



Horz Girder On Trn BHD. | **Transverse BHD Plate/Stiffener** | Vert Web On Trn BHD.

TB Group 1 | Tank Type: Wing Cargo Tank

Description: Upper | Xap (m): 152

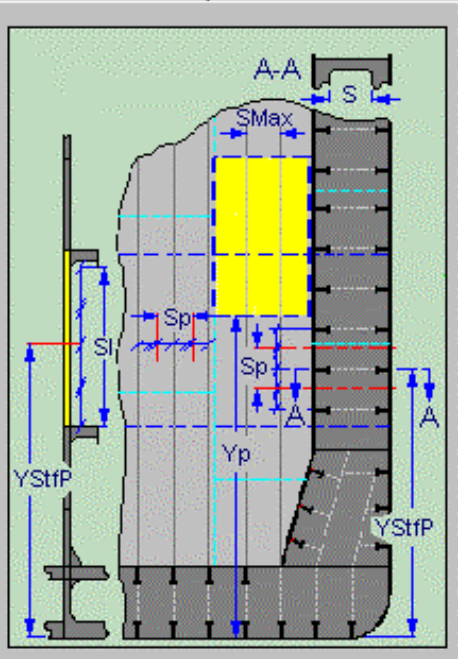
Plate

Group: Plate 1 | Zp (m): 11 | SMax (mm): 850 | Yp (m): 18.9

Description: TB Upper | Thick.(mm): 12 | Mat: MILD

Stiffener

No.	Type	Sp(mm)	Sl(m)	ZStfp(m)	YStfp(m)	Lib.ID	Mat.
1	1	850.00	5.100	11.000	21.450	11	MILD
2							
3							
4							
5							



Horz Girder On Trn BHD. | **Transverse BHD Plate/Stiffener** | Vert Web On Trn BHD.

TB Group 2 | Tank Type: Wing Cargo Tank

Description: Middle | Xap (m): 152

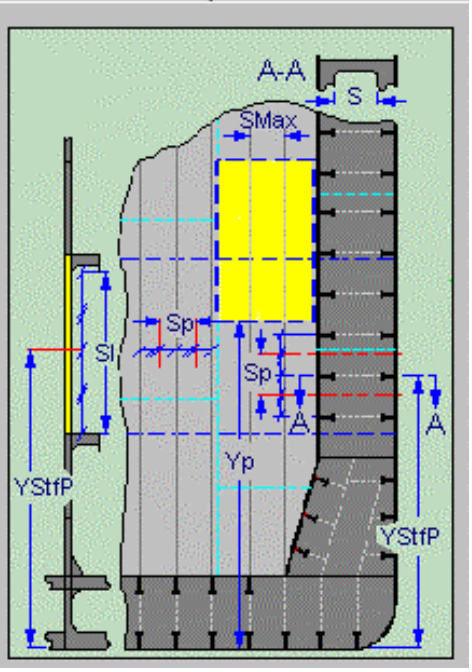
Plate

Group: Plate 1 | Zp (m): 11 | SMax (mm): 850 | Yp (m): 13.8

Description: TB Middle | Thick.(mm): 14 | Mat: MILD

Stiffener

No.	Type	Sp(mm)	Sl(m)	ZStfp(m)	YStfp(m)	Lib.ID	Mat.
1	1	850.00	5.100	11.000	16.350	16	MILD
2							
3							
4							
5							



Horz Girder On Trn BHD. | **Transverse BHD Plate/Stiffener** | Vert Web On Trn BHD.

TB Group 3 | Tank Type: Wing Cargo Tank

Description: Lower | Xap (m): 152

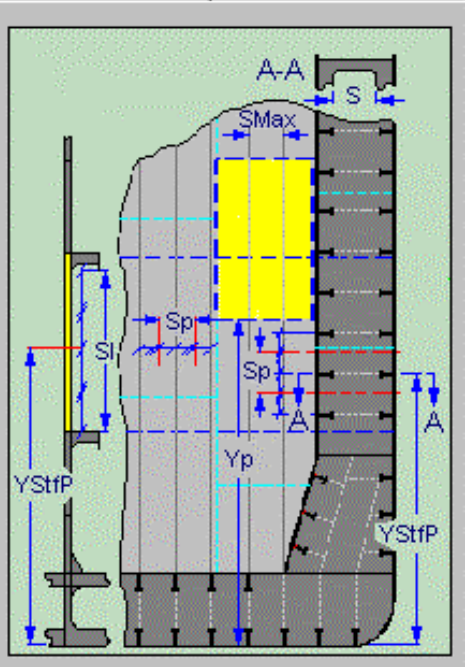
Plate

Group: Plate 1 | Zp (m): 11 | SMax (mm): 850 | Yp (m): 8.7

Description: TB Lower | Thick.(mm): 16 | Mat: MILD

Stiffener

No.	Type	Sp(mm)	Sl(m)	ZStfp(m)	YStfp(m)	Lib.ID	Mat.
1	1	850.00	5.100	11.000	11.250	20	MILD
2							
3							
4							
5							



Horz Girder On Trn BHD. | **Transverse BHD Plate/Stiffener** | Vert Web On Trn BHD.

TB Group 4 | Tank Type: Wing Cargo Tank

Description: Stool | Xap (m): 152

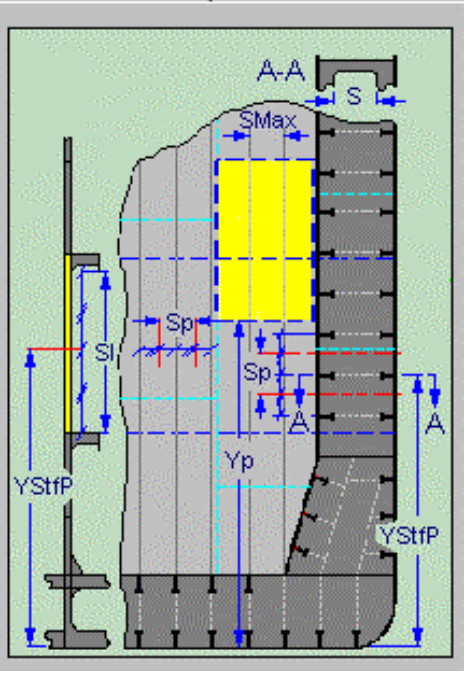
Plate

Group: Plate 1 | Zp (m): 11 | SMax (mm): 850 | Yp (m): 4.45

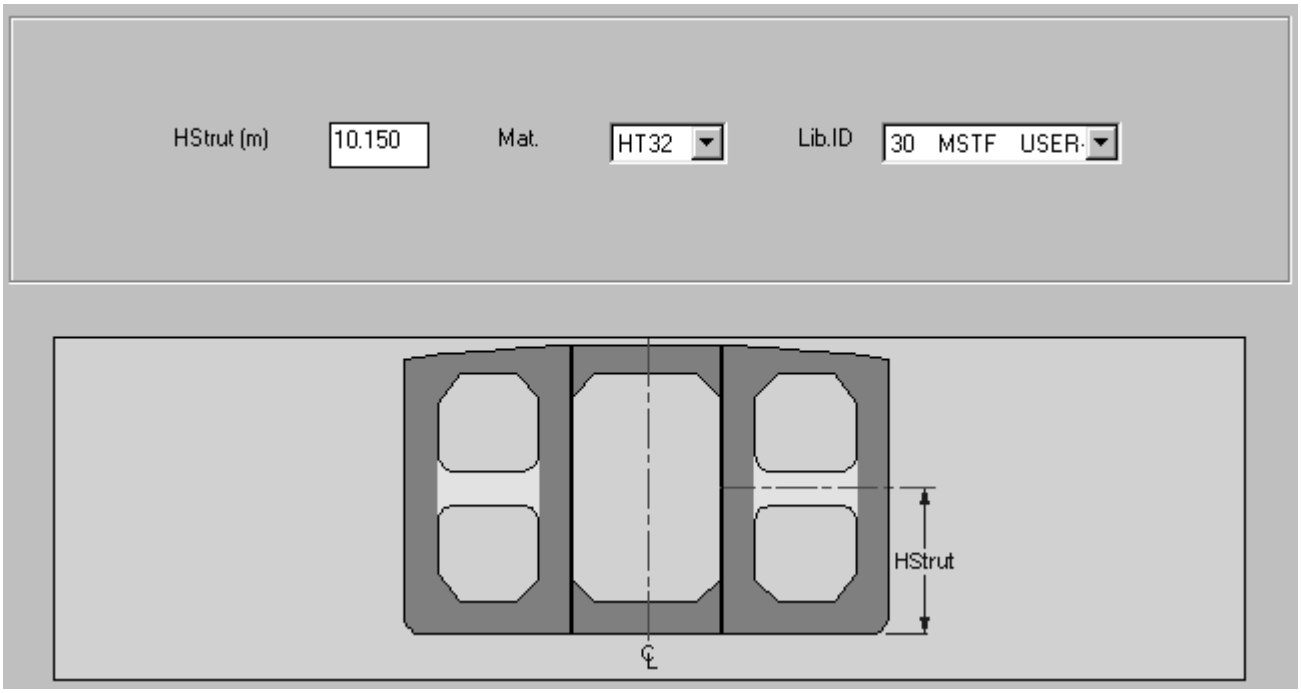
Description: TB Stool | Thick.(mm): 18 | Mat: MILD

Stiffener

No.	Type	Sp(mm)	Sl(m)	ZStfp(m)	YStfp(m)	Lib.ID	Mat.
1	1	850.00	4.250	11.000	6.575	18	MILD
2							
3							
4							
5							

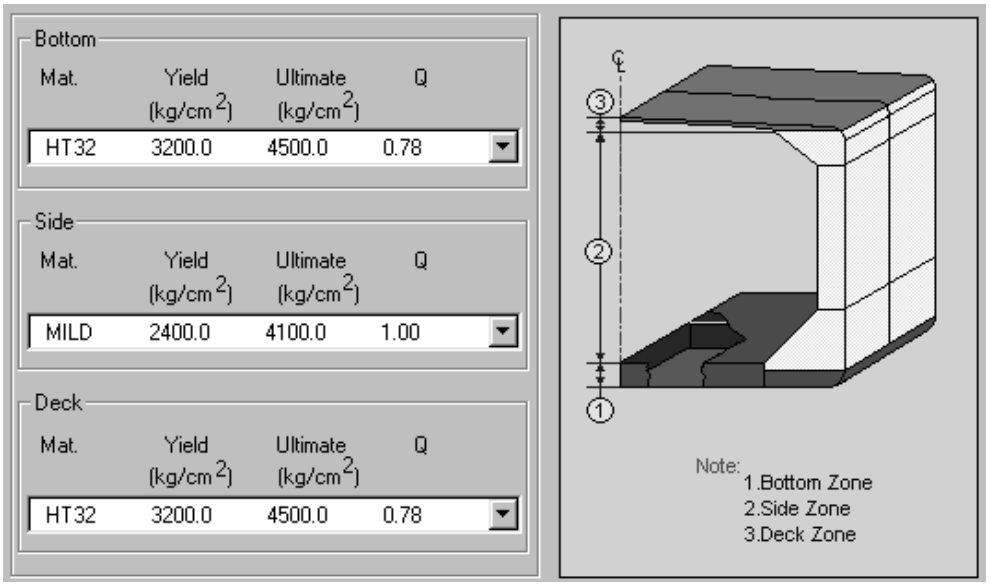


2.4.6 Struts



2.5 MATERIAL

2.5.1 Material Zones:



2.5.2 MATERIAL TABLE

==========

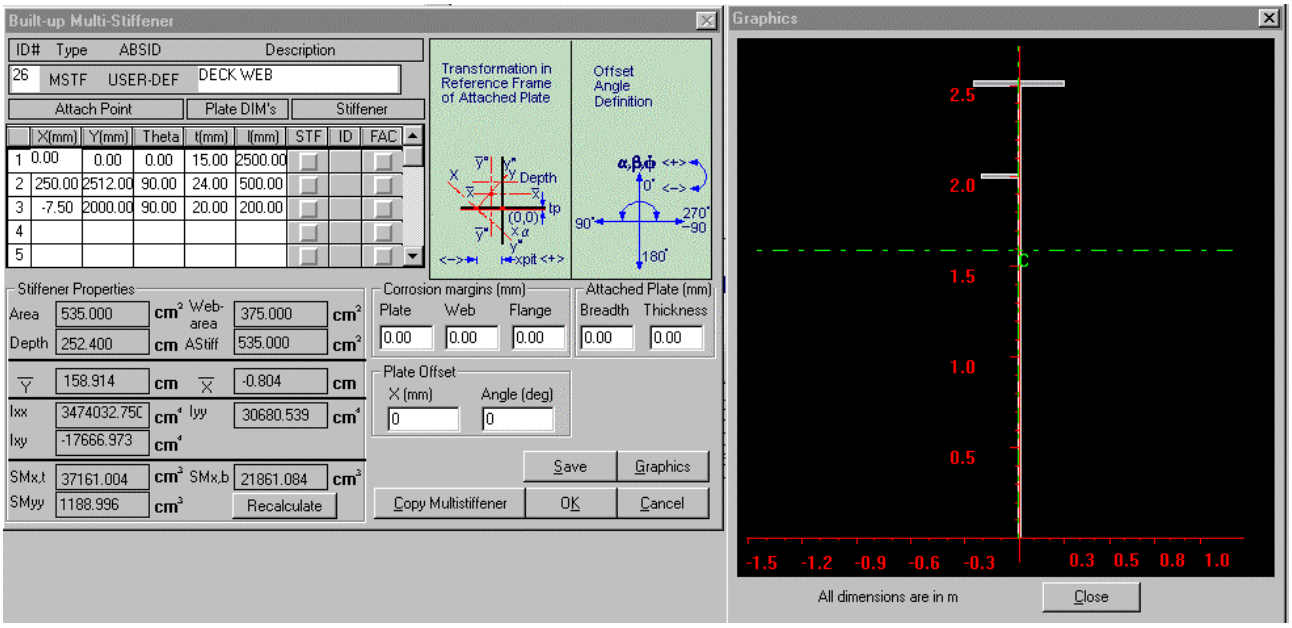
MAT #	MAT ID	YIELD STRESS	ULT STRESS	Q-FAC	Sm
(kgf/cm2)	(kgf/cm2)				
1	MILD	2400.	4100.	1.000	1.0
2	HT32	3200.	4500.	.780	.950
3	HT36	3600.	5000.	.720	.908
4	HT40	4000.	5200.	.680	.875

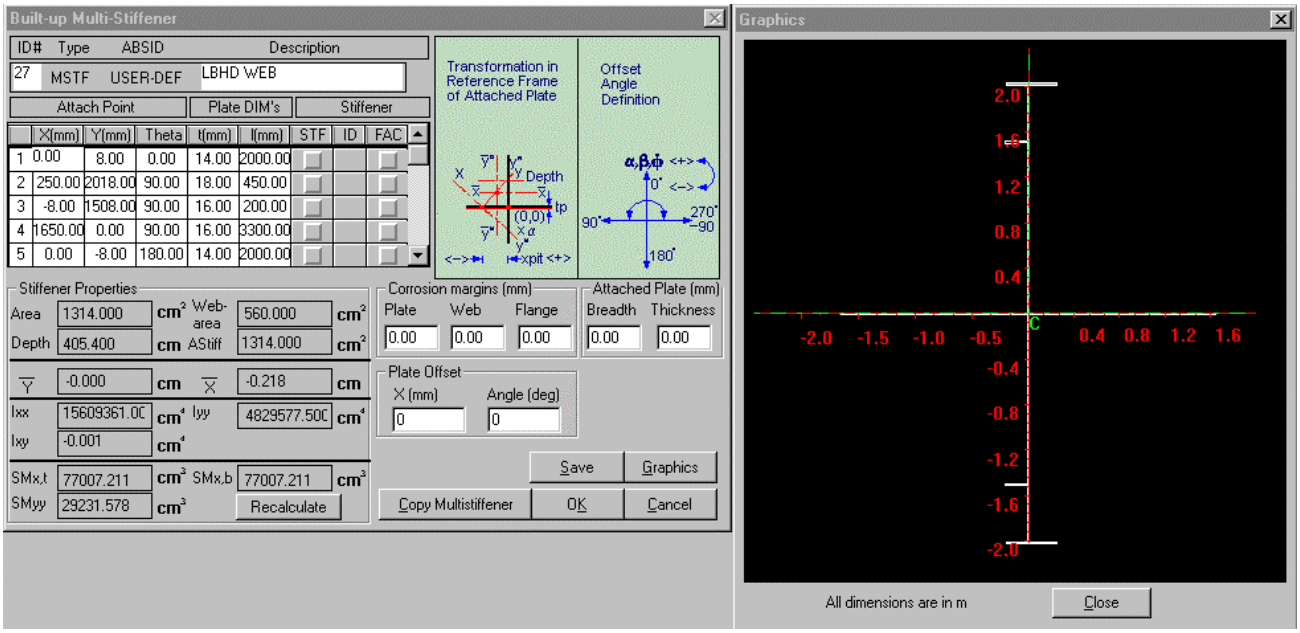
2.5.3 Stiffener Library:

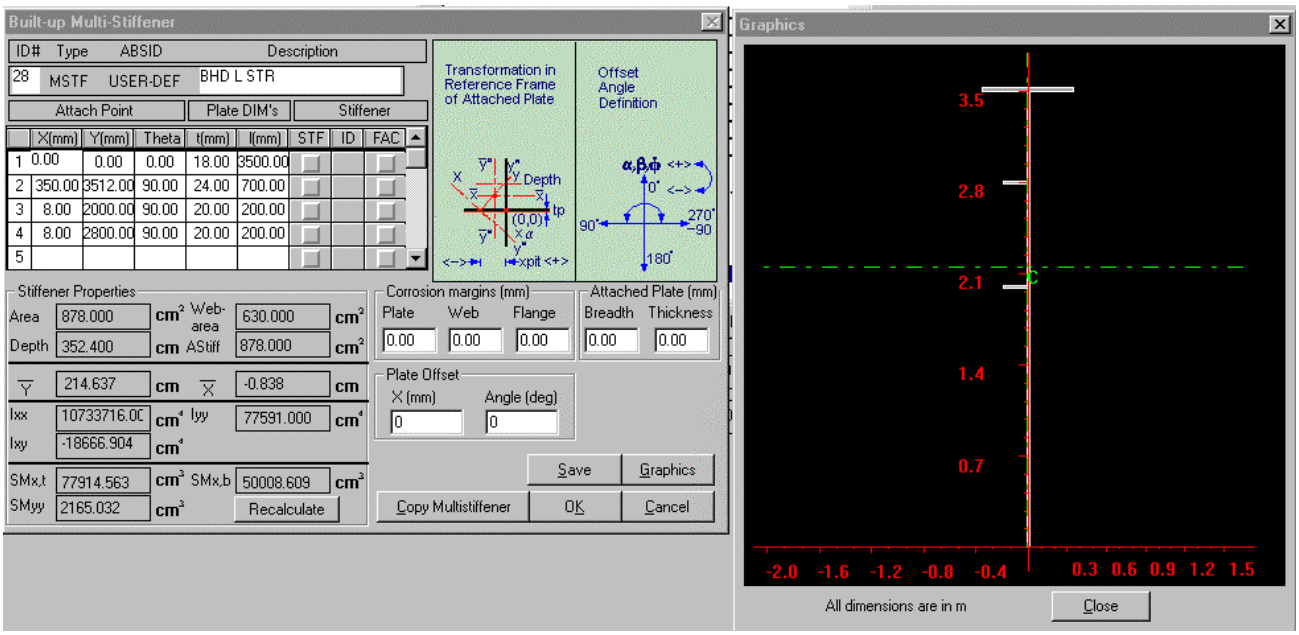
#---- STIFFENER PROPERTIES; FILE:C:\SH_50\SH100\SH100.slb ; RECORDS: 29

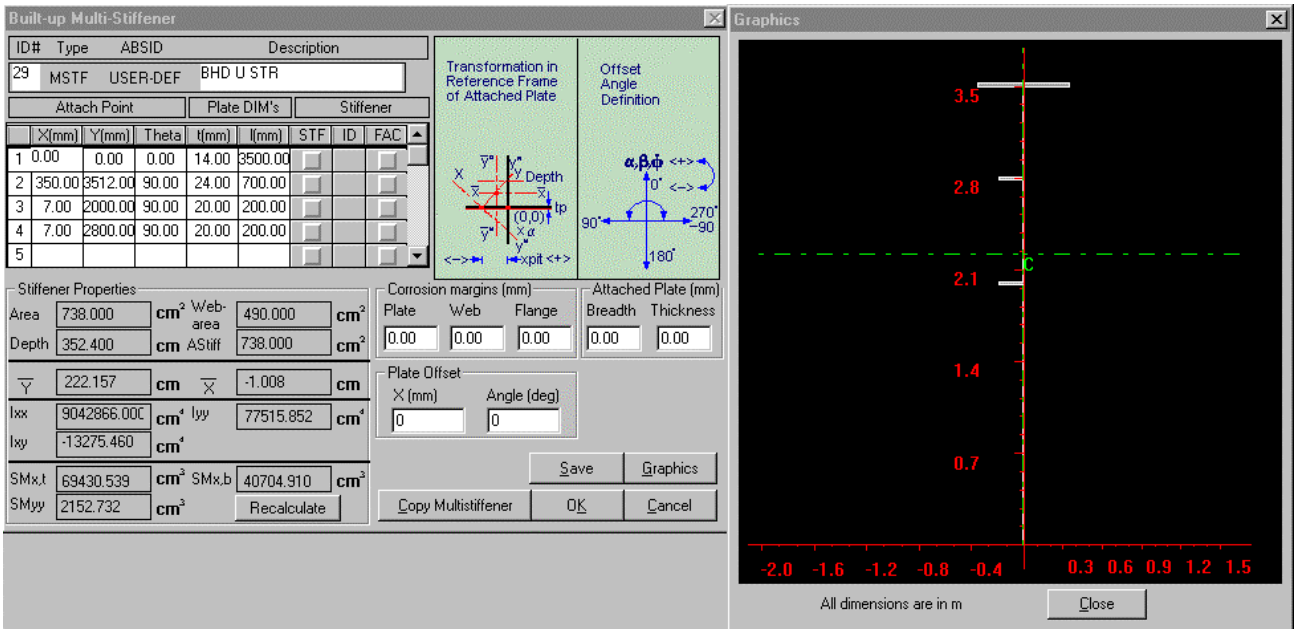
#ID#	TYPE	ABS ID	DESCRIPTION	VAR 1 (mm)	VAR 2 (mm)	VAR 3 (mm)	VAR 4 (mm)	VAR 5 (mm)	VAR 6 (mm)
#(dimensions)									
1	LANG	ILA200A	200x90x9x12 LIA	200.00	90.00	9.00	12.00	7.50	15.00
2	LANG	ILA225A	225x90x9x12 LIA	225.00	90.00	9.00	12.00	7.50	15.00
3	LANG	ILA250A	250x90x9x13 LIA	250.00	90.00	9.00	13.00	7.50	15.00
4	LANG	ILA250B	250x90x10.5x15 LIA	250.00	90.00	10.50	15.00	7.50	15.00
5	LANG	ILA250C	250x90x11.5x16 LIA	250.00	90.00	11.50	16.00	7.50	15.00
6	LANG	ILA275A	250x100x10.5x14 LIA	275.00	100.00	10.50	14.00	7.50	15.00
7	LANG	ILA300A	300x100x10.5x15 LIA	300.00	100.00	10.50	15.00	7.50	15.00
8	LANG	ILA300B	300x100x11.5x16 LIA	300.00	100.00	11.50	16.00	7.50	15.00
9	LANG	ILA325A	325x120x10.5x14 LIA	325.00	120.00	10.50	14.00	10.00	20.00
10	LANG	ILA325B	325x120x11.5x15 LIA	325.00	120.00	11.50	15.00	10.00	20.00
11	LANG	ILA350A	350x120x10.5x16 LIA	350.00	120.00	10.50	16.00	10.00	20.00
12	LANG	ILA350B	350x120x11.5x18 LIA	350.00	120.00	11.50	18.00	10.00	20.00
13	LANG	ILA375A	375x120x10.5x18 LIA	375.00	120.00	10.50	18.00	10.00	20.00
14	LANG	ILA375B	375x120x11.5x20 LIA	375.00	120.00	11.50	20.00	10.00	20.00
15	LANG	ILA400A	400x120x11.5x23 LIA	400.00	120.00	11.50	23.00	10.00	20.00
16	LANG	ILA425A	425x120x11.5x24 LIA	425.00	120.00	11.50	24.00	10.00	20.00
17	LANG	ILA450A	450x120x11.5x25 LIA	450.00	120.00	11.50	25.00	10.00	20.00
18	LANG	ILA475A	475x120x11.5x28 LIA	475.00	120.00	11.50	28.00	10.00	20.00
19	LANG	ILA475B	475x120x12.5x30 LIA	475.00	120.00	12.50	30.00	10.00	20.00
20	LANG	ILA500A	500x120x12.5x33 LIA	500.00	120.00	12.50	33.00	10.00	20.00
21	LANG	ILA500B	500x120x13.5x35 LIA	500.00	120.00	13.50	35.00	10.00	20.00
22	FLAT	USER-DEF	FB 400x28	400.00	28.00				
23	UANG	IUA150G	150X90X15 UIA	150.00	90.00	15.00	15.00	6.00	12.00
24	FLAT	USER-DEF	FB2000X12	2000.00	12.00				
25	FLAT	USER-DEF	FB2000X18	2000.00	18.00				
26	MSTF	USER-DEF	DECK WEB	3					
27	MSTF	USER-DEF	LBHD WEB	7					
28	MSTF	USER-DEF	BHD L STR	4					
29	MSTF	USER-DEF	BHD U STR	4					

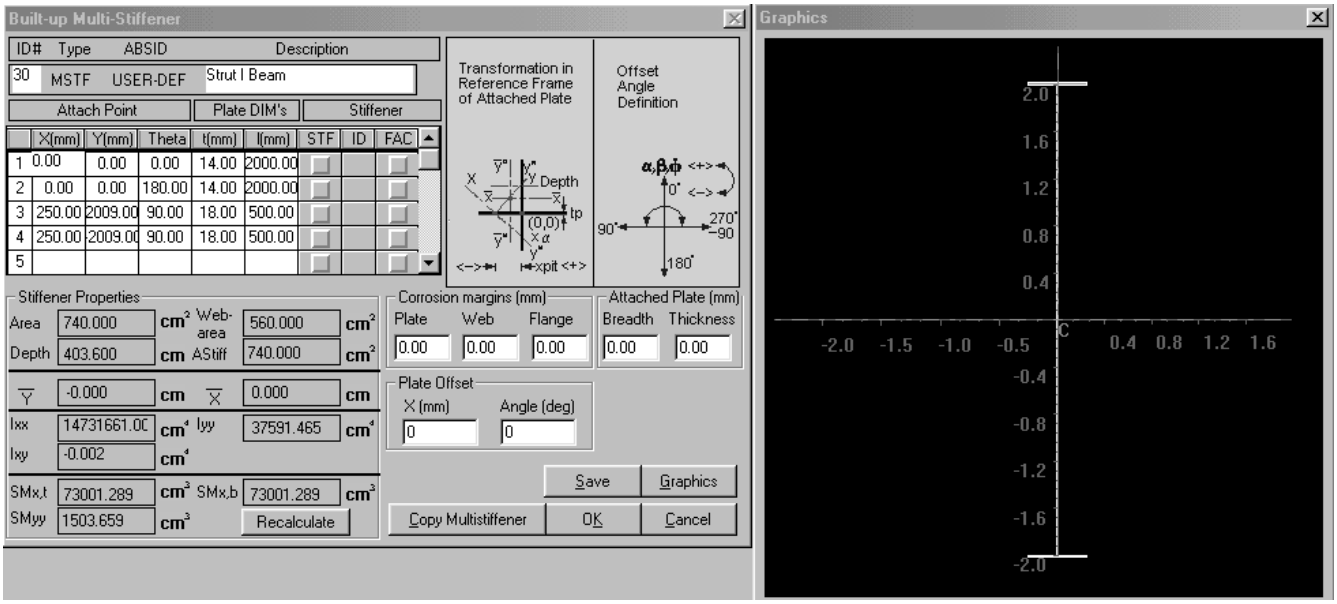
2.5.4 User-Defined Shapes / Webs:





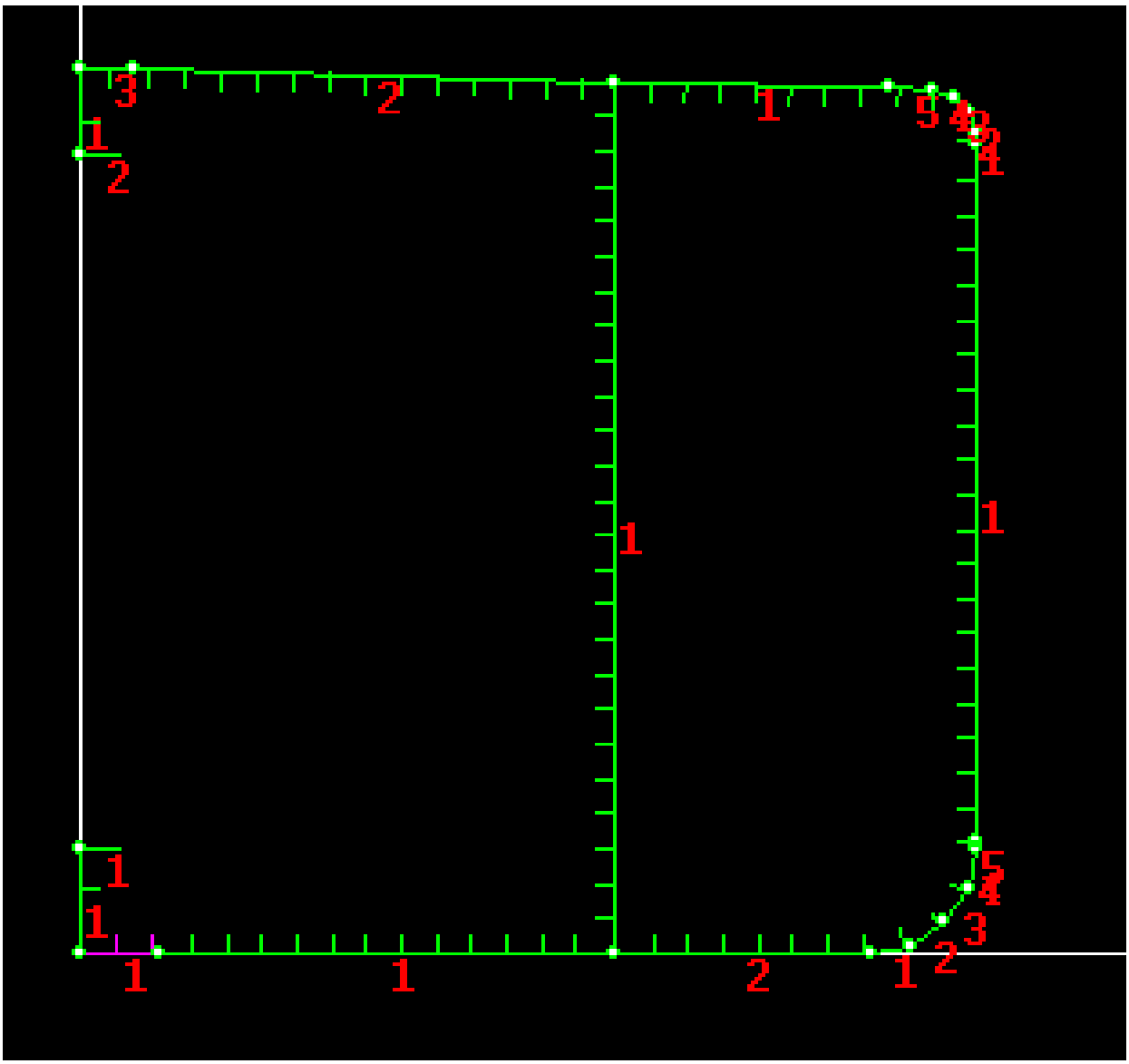

Built-up Multi-Stiffener
ID# Type ABSID Description
28 MSTF USER-DEF BHD L STR
Attach Point
Plate DIM's
Stiffener
X(mm) Y(mm) Theta t(mm) l(mm) STF ID FAC
1 0.00 0.00 0.00 18.00 3500.00
2 350.00 3512.00 90.00 24.00 700.00
3 8.00 2000.00 90.00 20.00 200.00
4 8.00 2800.00 90.00 20.00 200.00
5
Transformation in Reference Frame of Attached Plate
Offset Angle Definition
Depth
tp
(0,0)
xpit
α,β,φ
0°
90°
270°
-90
180°
Stiffener Properties
Area 878.000 cm²
Web-area 630.000 cm²
Depth 352.400 cm
AStiff 878.000 cm²
Ȳ 214.637 cm
X̄ -0.838 cm
Ixx 10733716.00 cm⁴
Iyy 77591.000 cm⁴
Ixy -18666.904 cm⁴
SMx,t 77914.563 cm³
SMx,b 50008.609 cm³
SMyy 2165.032 cm³
Recalculate
Corrosion margins (mm)
Plate Web Flange
0.00 0.00 0.00
Attached Plate (mm)
Breadth Thickness
0.00 0.00
Plate Offset
X (mm) Angle (deg)
0 0
Save
Graphics
Copy Multistiffener
OK
Cancel
Graphics
3.5
2.8
2.1
1.4
0.7
-2.0 -1.6 -1.2 -0.8 -0.4
0.3 0.6 0.9 1.2 1.5
All dimensions are in m
Close


Built-up Multi-Stiffener
ID# Type ABSID Description
29 MSTF USER-DEF BHD U STR
Attach Point
Plate DIM's
Stiffener
X(mm) Y(mm) Theta t(mm) l(mm) STF ID FAC
1 0.00 0.00 0.00 14.00 3500.00
2 350.00 3512.00 90.00 24.00 700.00
3 7.00 2000.00 90.00 20.00 200.00
4 7.00 2800.00 90.00 20.00 200.00
5
Transformation in Reference Frame of Attached Plate
Offset Angle Definition
Depth
tp
(0,0)
xpit
α,β,φ
0°
90°
270°
-90
180°
Stiffener Properties
Area 738.000 cm²
Web-area 490.000 cm²
Depth 352.400 cm
AStiff 738.000 cm²
Ȳ 222.157 cm
X̄ -1.008 cm
Ixx 9042866.000 cm⁴
Iyy 77515.852 cm⁴
Ixy -13275.460 cm⁴
SMx,t 69430.539 cm³
SMx,b 40704.910 cm³
SMyy 2152.732 cm³
Recalculate
Corrosion margins (mm)
Plate Web Flange
0.00 0.00 0.00
Attached Plate (mm)
Breadth Thickness
0.00 0.00
Plate Offset
X (mm) Angle (deg)
0 0
Save
Graphics
Copy Multistiffener
OK
Cancel
Graphics
3.5
2.8
2.1
1.4
0.7
-2.0 -1.6 -1.2 -0.8 -0.4
0.3 0.6 0.9 1.2 1.5
All dimensions are in m
Close

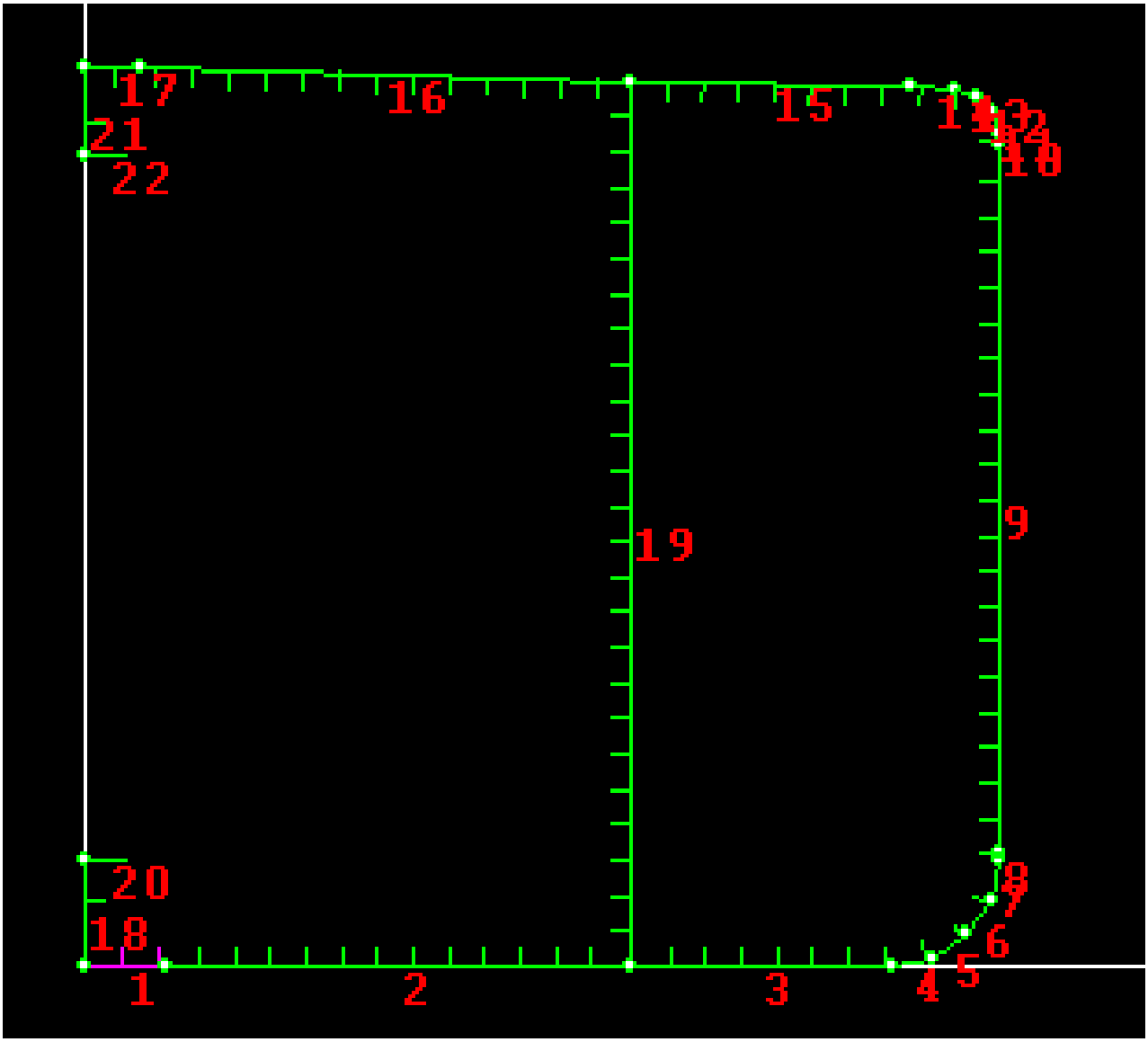

Built-up Multi-Stiffener
ID# Type ABSID Description
30 MSTF USER-DEF Strut I Beam
Attach Point
Plate DIM's
Stiffener
X(mm) Y(mm) Theta t(mm) l(mm) STF ID FAC
1 0.00 0.00 0.00 14.00 2000.00
2 0.00 0.00 180.00 14.00 2000.00
3 250.00 2009.00 90.00 18.00 500.00
4 250.00 2009.00 90.00 18.00 500.00
5
Transformation in Reference Frame of Attached Plate
Depth
tp
(0,0)
xpit
Offset Angle Definition
α,β,φ
0°
90°
270°
-90
180°
Stiffener Properties
Area 740.000 cm² Web-area 560.000 cm²
Depth 403.600 cm AStiff 740.000 cm²
Ȳ -0.000 cm X̄ 0.000 cm
Ixx 14731661.00 cm⁴ Iyy 37591.465 cm⁴
Ixy -0.002 cm⁴
SMx,t 73001.289 cm³ SMx,b 73001.289 cm³
SMyy 1503.659 cm³
Recalculate
Corrosion margins (mm)
Plate Web Flange
0.00 0.00 0.00
Attached Plate (mm)
Breadth Thickness
0.00 0.00
Plate Offset
X (mm) Angle (deg)
0 0
Save
Graphics
Copy Multistiffener
OK
Cancel
Graphics
2.0
1.6
1.2
0.8
0.4
-2.0 -1.5 -1.0 -0.5 C 0.4 0.8 1.2 1.6
-0.4
-0.8
-1.2
-1.6
-2.0

2.6 LONGITUDINAL PLATE AND STIFFENER ELEMENTS

2.6.1 Local Plate IDs:



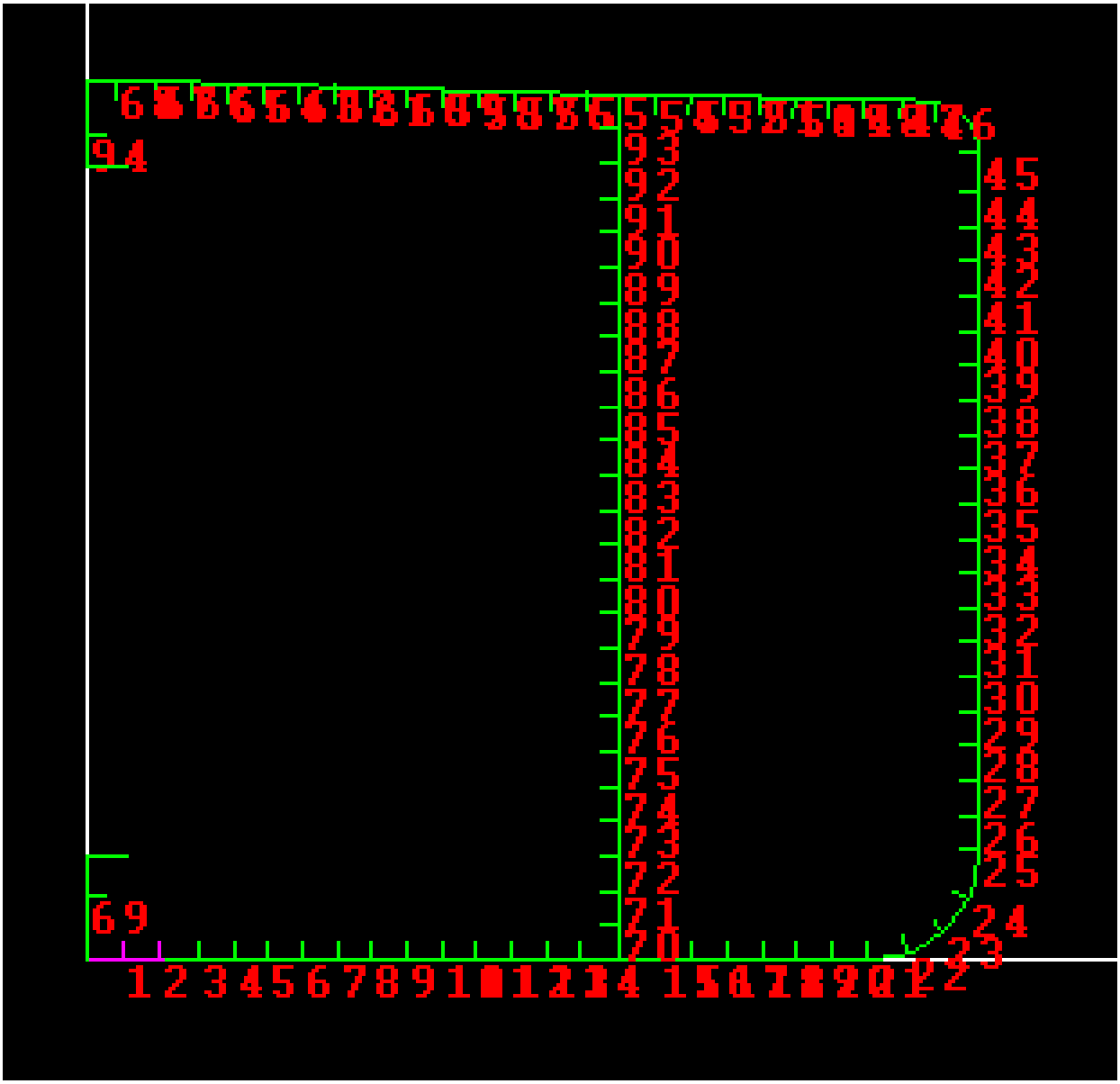
2.6.2 Global Plate Ids:



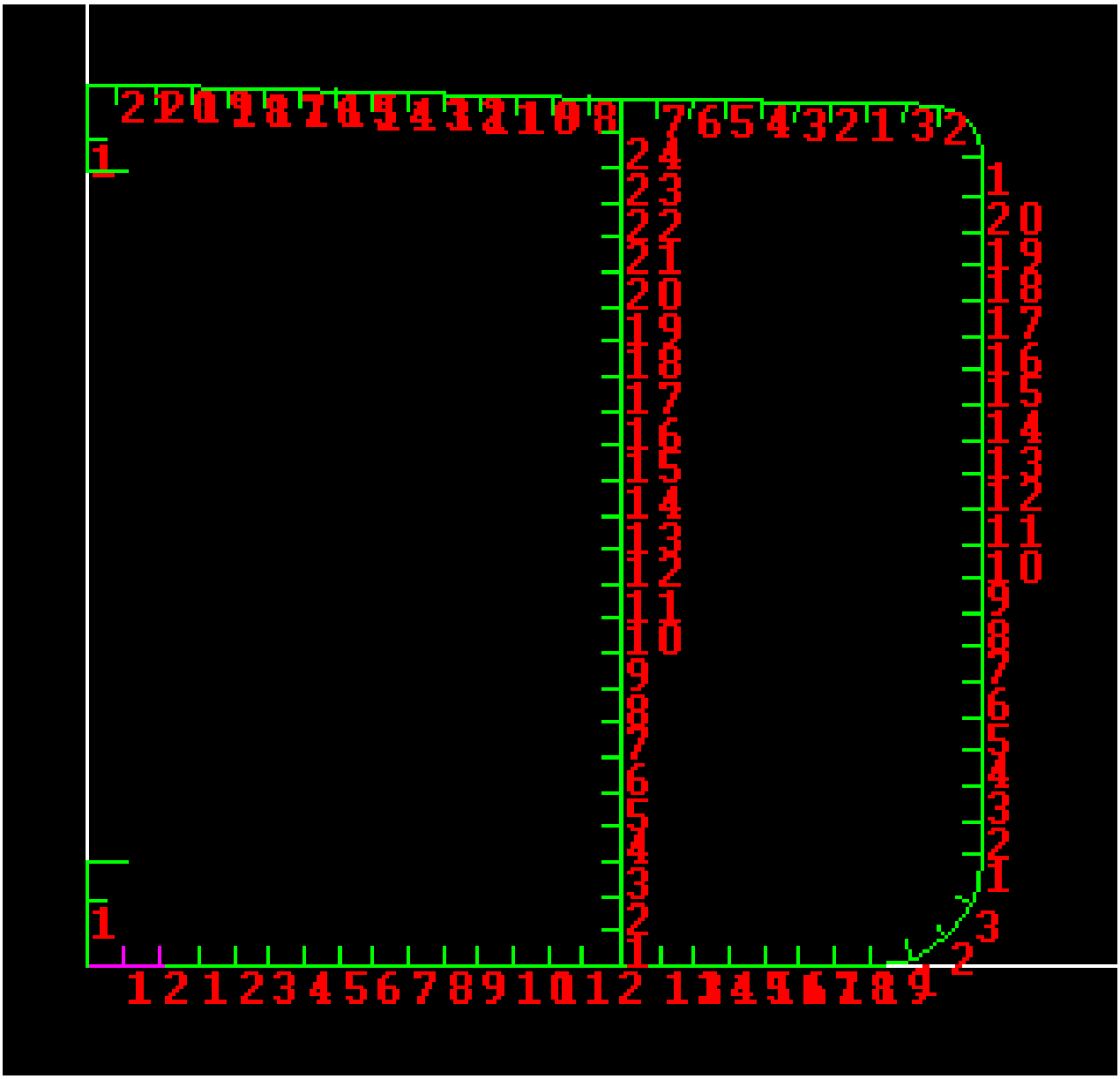
2.6.3 Plate:

DESCRIPTION	ID	B m	TP cm	A cm2	SPACING (m)	MATID	START X-COORD	START Y-COORD	END X-COORD	END Y-COORD
KEEL PLATE	KPL-01	1.8	2	360	0.96	3	0	0	1.8	0
BOTTOM	BTM-01	10.7	1.7	1819	0.96	3	1.8	0	12.5	0
BOTTOM	BTM-02	6	1.7	1020	0.92	3	12.5	0	18.5	0
BILGE	BLG-01	0.976	1.7	165.87	0.98	3	18.5	0	19.457	0.19
BILGE	BLG-02	0.975	1.7	165.82	0.976	3	19.457	0.19	20.268	0.732
BILGE	BLG-03	0.975	1.7	165.82	1.131	3	20.268	0.732	20.81	1.543
BILGE	BLG-04	0.976	1.7	165.87	1.231	3	20.81	1.543	21	2.5
BILGE	BLG-05	0.1	1.7	17	1.076	3	21	2.5	21	2.6
SIDE	SHL-01	16.4	1.6	2624	0.92	2	21	2.6	21	19
GUNWALE	GWR-01	0.3	1.7	51	0.92	2	21	19	21	19.3
GUNWALE	GWR-02	0.518	1.7	88	0.718	2	21	19.3	20.866	19.8
GUNWALE	GWR-03	0.518	1.7	87.99	0.518	2	20.866	19.8	20.5	20.166
GUNWALE	GWR-04	0.518	1.7	88	0.518	2	20.5	20.166	20	20.3
GUNWALE	GWR-05	1.001	1.7	170.2	0.901	2	20	20.3	19	20.348
UPPER DECK	DEC-01	6.502	1.7	1105.31	0.901	2	19	20.348	12.5	20.502
UPPER DECK	DEC-02	11.304	1.7	1921.67	0.904	2	12.5	20.502	1.2	20.8
UPPER DECK	DEC-03	1.2	1.7	204	0.904	2	1.2	20.8	0	20.8
N-TIGHT B. GDR	NBG-01	2.5	2.2	275	1.5	2	0	0	0	2.5
Other BULKHEAD	OTH-01	20.502	1.6	3280.32	0.822	2	12.5	0	12.5	20.502
MISC.	MSC-01	1	2	200	1	2	0	2.5	1	2.5
MISC.	MSC-02	2	1.7	170	1.25	2	0	20.8	0	18.8
MISC.	MSC-03	1	1.7	170	1	2	0	18.8	1	18.8

2.6.4 Local Stiffener Ids:



2.6.5 Global Stiffener IDs:



2.6.6 Stiffeners:

ID	MSID	XLB	A	STFSP	UNSPAN	MATID
			cm2	(m)	(m)	
KPL- 101	21	500x120x13.5x35 LIA	105.42	0.82	3.815	2
KPL- 102	21	500x120x13.5x35 LIA	105.42	0.89	3.815	2
BTM- 101	21	500x120x13.5x35 LIA	105.42	0.89	3.815	2
BTM- 102	21	500x120x13.5x35 LIA	105.42	0.82	3.815	2
BTM- 103	21	500x120x13.5x35 LIA	105.42	0.82	3.815	2
BTM- 104	21	500x120x13.5x35 LIA	105.42	0.82	3.815	2

BTM- 105	21	500x120x13.5x35 LIA	105.42	0.82	3.815	2
BTM- 106	21	500x120x13.5x35 LIA	105.42	0.82	3.815	2
BTM- 107	21	500x120x13.5x35 LIA	105.42	0.82	3.815	2
BTM- 108	21	500x120x13.5x35 LIA	105.42	0.82	3.815	2
BTM- 109	21	500x120x13.5x35 LIA	105.42	0.82	3.815	2
BTM- 110	21	500x120x13.5x35 LIA	105.42	0.82	3.815	2
BTM- 111	21	500x120x13.5x35 LIA	105.42	0.82	3.815	2
BTM- 112	21	500x120x13.5x35 LIA	105.42	0.85	3.815	2
BTM- 213	21	500x120x13.5x35 LIA	105.42	0.87	3.815	2
BTM- 214	21	500x120x13.5x35 LIA	105.42	0.82	3.815	2
BTM- 215	21	500x120x13.5x35 LIA	105.42	0.82	3.815	2
BTM- 216	21	500x120x13.5x35 LIA	105.42	0.82	3.815	2
BTM- 217	21	500x120x13.5x35 LIA	105.42	0.82	3.815	2
BTM- 218	21	500x120x13.5x35 LIA	105.42	0.82	3.815	2
BTM- 219	21	500x120x13.5x35 LIA	105.42	1.053	3.815	2
BLG- 101	0	500x120x13.5x35 LIA	105.42	0.488	3.815	2
BLG- 202	0	500x120x13.5x35 LIA	105.42	0.488	3.815	2
BLG- 303	0	500x120x13.5x35 LIA	105.42	0.488	3.815	2
SHL- 101	20	500x120x12.5x33 LIA	98.62	0.82	4.515	2
SHL- 102	20	500x120x12.5x33 LIA	98.62	0.82	4.515	2
SHL- 103	20	500x120x12.5x33 LIA	98.62	0.82	4.515	2
SHL- 104	20	500x120x12.5x33 LIA	98.62	0.82	4.515	2
SHL- 105	20	500x120x12.5x33 LIA	98.62	0.82	4.515	2
SHL- 106	20	500x120x12.5x33 LIA	98.62	0.82	4.515	2
SHL- 107	20	500x120x12.5x33 LIA	98.62	0.82	4.515	2
SHL- 108	20	500x120x12.5x33 LIA	98.62	0.82	4.515	2
SHL- 109	20	500x120x12.5x33 LIA	98.62	0.82	4.515	2
SHL- 110	20	500x120x12.5x33 LIA	98.62	0.82	4.515	2
SHL- 111	20	500x120x12.5x33 LIA	98.62	0.82	4.515	2
SHL- 112	20	500x120x12.5x33 LIA	98.62	0.82	4.515	2
SHL- 113	20	500x120x12.5x33 LIA	98.62	0.82	4.515	2
SHL- 114	20	500x120x12.5x33 LIA	98.62	0.82	4.515	2
SHL- 115	20	500x120x12.5x33 LIA	98.62	0.82	4.515	2
SHL- 116	20	500x120x12.5x33 LIA	98.62	0.82	4.515	2
SHL- 117	20	500x120x12.5x33 LIA	98.62	0.82	4.515	2
SHL- 118	20	500x120x12.5x33 LIA	98.62	0.82	4.515	2
SHL- 119	20	500x120x12.5x33 LIA	98.62	0.82	4.515	2
SHL- 120	20	500x120x12.5x33 LIA	98.62	0.82	4.515	2
GWR- 101	14	375x120x11.5x20 LIA	65.47	0.15	4.515	2
GWR- 502	14	375x120x11.5x20 LIA	65.47	0.82	4.515	2
GWR- 503	14	375x120x11.5x20 LIA	65.47	0.861	4.515	2
DEC- 101	18	475x120x11.5x28 LIA	85.65	0.861	4.515	2
DEC- 102	18	475x120x11.5x28 LIA	85.65	0.82	4.515	2
DEC- 103	18	475x120x11.5x28 LIA	85.65	0.82	4.515	2
DEC- 104	18	475x120x11.5x28 LIA	85.65	0.82	4.515	2
DEC- 105	18	475x120x11.5x28 LIA	85.65	0.82	4.515	2
DEC- 106	18	475x120x11.5x28 LIA	85.65	0.82	4.515	2
DEC- 107	18	475x120x11.5x28 LIA	85.65	0.841	4.515	2
DEC- 208	18	475x120x11.5x28 LIA	85.65	0.8	4.515	2
DEC- 209	18	475x120x11.5x28 LIA	85.65	0.85	4.515	2
DEC- 210	18	475x120x11.5x28 LIA	85.65	0.85	4.515	2
DEC- 211	18	475x120x11.5x28 LIA	85.65	0.85	4.515	2

DEC- 212	18	475x120x11.5x28 LIA	85.65	0.85	4.515	2
DEC- 213	18	475x120x11.5x28 LIA	85.65	0.85	4.515	2
DEC- 214	18	475x120x11.5x28 LIA	85.65	0.85	4.515	2
DEC- 215	18	475x120x11.5x28 LIA	85.65	0.85	4.515	2
DEC- 216	18	475x120x11.5x28 LIA	85.65	0.85	4.515	2
DEC- 217	18	475x120x11.5x28 LIA	85.65	0.85	4.515	2
DEC- 218	18	475x120x11.5x28 LIA	85.65	0.85	4.515	2
DEC- 219	18	475x120x11.5x28 LIA	85.65	0.85	4.515	2
DEC- 220	18	475x120x11.5x28 LIA	85.65	0.927	4.515	2
DEC- 321	18	475x120x11.5x28 LIA	85.65	0.6	4.515	2
NBG- 101	14	375x120x11.5x20 LIA	32.73	1.25	4.515	2
OTH- 101	20	500x120x12.5x33 LIA	98.62	0.82	4.515	2
OTH- 102	20	500x120x12.5x33 LIA	98.62	0.82	4.515	2
OTH- 103	20	500x120x12.5x33 LIA	98.62	0.82	4.515	2
OTH- 104	20	500x120x12.5x33 LIA	98.62	0.82	4.515	2
OTH- 105	20	500x120x12.5x33 LIA	98.62	0.82	4.515	2
OTH- 106	20	500x120x12.5x33 LIA	98.62	0.82	4.515	2
OTH- 107	20	500x120x12.5x33 LIA	98.62	0.82	4.515	2
OTH- 108	20	500x120x12.5x33 LIA	98.62	0.82	4.515	2
OTH- 109	20	500x120x12.5x33 LIA	98.62	0.82	4.515	2
OTH- 110	20	500x120x12.5x33 LIA	98.62	0.82	4.515	2
OTH- 111	20	500x120x12.5x33 LIA	98.62	0.82	4.515	2
OTH- 112	20	500x120x12.5x33 LIA	98.62	0.82	4.515	2
OTH- 113	20	500x120x12.5x33 LIA	98.62	0.82	4.515	2
OTH- 114	20	500x120x12.5x33 LIA	98.62	0.82	4.515	2
OTH- 115	20	500x120x12.5x33 LIA	98.62	0.82	4.515	2
OTH- 116	20	500x120x12.5x33 LIA	98.62	0.82	4.515	2
OTH- 117	20	500x120x12.5x33 LIA	98.62	0.82	4.515	2
OTH- 118	20	500x120x12.5x33 LIA	98.62	0.82	4.515	2
OTH- 119	20	500x120x12.5x33 LIA	98.62	0.82	4.515	2
OTH- 120	20	500x120x12.5x33 LIA	98.62	0.82	4.515	2
OTH- 121	20	500x120x12.5x33 LIA	98.62	0.82	4.515	2
OTH- 122	20	500x120x12.5x33 LIA	98.62	0.82	4.515	2
OTH- 123	20	500x120x12.5x33 LIA	98.62	0.82	4.515	2
OTH- 124	20	500x120x12.5x33 LIA	98.62	0.821	4.515	2
MSC- 201	14	375x120x11.5x20 LIA	32.73	1.5	5.015	2

B.3 STRUCTURAL INPUT DATA FOR SIMCOL VERSION 2.1

The structural input data for test matrices and the validation case are given in the following sections. In test matrices, the struck ship is the 150,000 dwt double hull tanker given in Appendix B1, and the striking ship is a 150,000 dwt bulk carrier. In the validation case, the struck ship is the 100,000 dwt single hull tanker given in Appendix B2, and the striking ship is a 23,000 dwt container ship.

B.3.1 Structural Data for Test Matrices

```
(150k dwt double hull tanker struck by 150k dwt bulk carrier)
2
264.  48.   24.   16.8  178.867E6   3.3
274.  47.   16.   174.850E6   26.   49.
7
13.   46.   79.   112. 145. 178. 211.
5
24.   .02192      1
22.   .02294      1
0.    .02228      1
.04723      .02692      .02829      2.32
3
18.9  13.8  8.7
.01534      .01534      .01534
2     2.    .85
1     .012  .1252
1     .018  .1292
15.82
3.75
.002  .04
2     4.    .85
1     .014  .077
1     .014  .077
15.7
3.75
.002  .04
```

B.3.2 Structural Data for the Validation Case

```
(100k dwt single hull tanker struck by 23k dwt container ship)
1
222.  42.   20.3  6.965 56.073E6    5.
220.9 26.01 9.684 37.076E6    20.   50.
8
6.    31.   56.   81.   106.  131.  156.  181.
4
21.   .02678      2
```

```
12.5  .02782      2
.03627      .0442
0     0.
3     2.    .92
1     .015  .05644
1     .015  .05644
1     .015  .05644
4.45  4.45
3.7   4.
1     .086  .0584 4.5
.002  .04
2     2.    .822
1     .015  .05654
1     .015  .05654
12.9
3.7
.002  .04
```