Расчет прочности боковых стен надстройки плавдачи «Онега-1080»

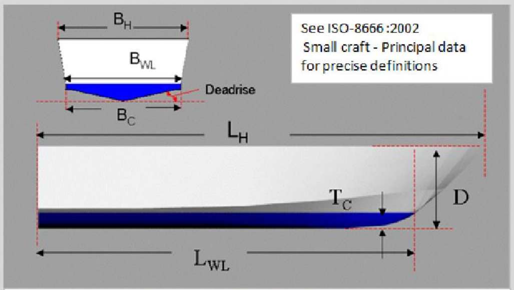
MANUFACTURER/PERSON RESPONSIBLE FOR REPORT	Yacht Engineering		
Contact details	marineeng.ru		
BOAT:	Plavdom Onega 1080 Catamaran version	Report	2 февраля 2020 г.

CRAFT PRINCIPAL DATA

SELF-CERTIFIER-12215-5

Hull length (Pt.5, 6.1)	11,000 m	L_H
Length of waterline (Pt.5, 6.1)	10,700 m	L_{WL}
Maximum beam	4,200 m	B_H
Waterline beam	4,100 m	B_{WL}
Chine beam (Pt.5 Ref 6.1)	1,240 m	B_C
Draft at mid-LWL	0,700 m	T_c
Hull depth at mid-LWL	1,700 m	D
Maximum displacement (Pt 5 3.2)	11000 kg	m_{LDC}
Bottom deadrise angle @ 0.4L_{WL}	30 deg	β
Maximum speed (Pt.5, 6.1)	10,0 knots	V
Design Category (Pt 5, 3.1)	C	

See typicals? No



Please note: ISO-12215-5 uses the AFT end of the waterline as the datum for defining deadrise angle and longitudinal locations of components

Dynamic load factor 0,08 g's

Zone and mode	Base pressures		Minimums		Pt.5 clause
Bottom displacement mode	$p_{BMD\ BASE}$	71,7 kPa	p_{BMMIN}	15,5 kPa	8.1.2
Bottom planing mode	$p_{BMP\ BASE}$	88,3 kPa	p_{BMMIN}	15,5 kPa	8.1.3
Side			p_{SMIN}	5,8 kPa	8.1.4
Deck	$p_{DM\ BASE}$	18,3 kPa	p_{DMIN}	5,0 kPa	8.1.6

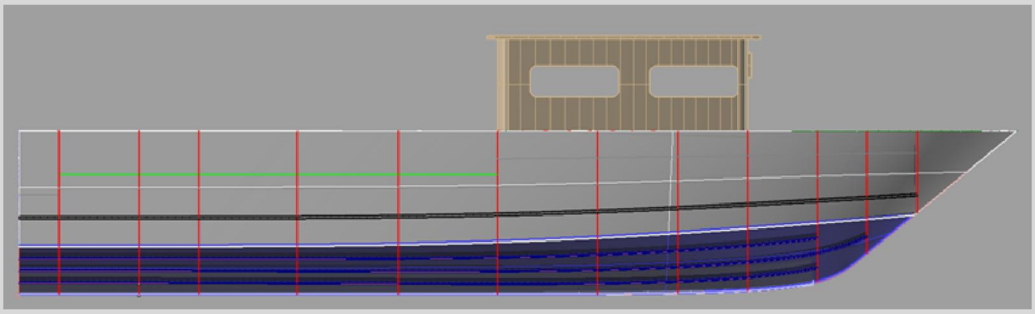
GLASS REINFORCED POLYESTER

Further explanations? No

ft, lbs Convert units? m, kg No

Исходные данные для расчета.

CRITICAL DECKHOUSE STRUCTURAL COMPONENTS



Type	Sandwich				
ITEM	b (mm)	L (mm)	c (mm)	x (m)	Position
Panel Dh1	900	2400	0	7,300	Others

ITEM	s (mm)	L_u (mm)	c (mm)	x(m)	Position
Stiff Dh1	900	2400	0	7,200	Others

Type	Sandwich				
ITEM	b (mm)	L (mm)	c (mm)	x (m)	Position
Panel Dh2	900	2400	0	5,500	Front

ITEM	s (mm)	L_u (mm)	c (mm)	x(m)	Position
Stiff Dh2	900	2400	0	5,800	Front

Расчетные размеры панелей и ребер жесткости. Шаг 900 мм, длина 2400 мм.

Go To DECKHOUSE zone

DECK PANEL LAYUP SCHEDULE (SANDWICH SKIN)

Go To DECKHOUSE zone

PANEL Dh1 — Zone — User decision

Clear all plies

Ply No.	Label	No. plies	Glass	+ Resin	t (mm)
1	*CSM600(S)*	*1*	600	2000	1,40
2	*WR600(S)*	*1*	600	1250	0,78
3	*None*	*0*	0	0	0,00
4	*None*	*0*	0	0	0,00
5	*None*	*0*	0	0	0,00
6	*None*	*0*	0	0	0,00
Core	*PVC-60*				20,00
7	*WR600(S)*	*1*	600	1250	0,78
8	*None*	*0*	0	0	0,00
9	*None*	*0*	0	0	0,00
10	*None*	*0*	0	0	0,00
11	*None*	*0*	0	0	0,00

ISO-12215-5 REQUIREMENT

Criterion	Required	Actual	CF	RESULT
Min Fibre gsm - OUTER	512	1200	2,34	PASSES
Min Fibre gsm - INNER	323	600	1,86	PASSES
Shear strength (N/mm)	2,18	8,62	3,95	PASSES
Flexural strength (N)	338	928	2,75	PASSES
Stiffness (kN.m)	0,505	2,434	4,82	PASSES

PANEL Dh2 — Zone — User decision

Clear all plies

Ply No.	Label	No. plies	Glass	+ Resin	t (mm)
1	*CSM600(S)*	*1*	600	2000	1,40
2	*WR600(S)*	*1*	600	1250	0,78
3	*None*	*0*	0	0	0,00
4	*None*	*0*	0	0	0,00
5	*None*	*0*	0	0	0,00
6	*None*	*0*	0	0	0,00
Core	*PVC-60*				20,00
7	*WR600(S)*	*1*	600	1250	0,78
8	*None*	*0*	0	0	0,00
9	*None*	*0*	0	0	0,00
10	*None*	*0*	0	0	0,00
11	*None*	*0*	0	0	0,00

ISO-12215-5 REQUIREMENT

Criterion	Required	Actual	CF	RESULT
Min Fibre gsm - OUTER	512	1200	2,34	PASSES
Min Fibre gsm - INNER	323	600	1,86	PASSES
Shear strength (N/mm)	2,18	8,62	3,95	PASSES
Flexural strength (N)	338	928	2,75	PASSES
Stiffness (kN.m)	0,505	2,434	4,82	PASSES

PANEL Dh1

b (mm)	900	L (mm)	2400	k_c
c (mm)	0	x (m)	7,30	1,000
L_{max} (mm)	2250	for A_D	A_D (m^2)	2,025
L_{max} (mm)	1888	for k_2	k_2	0,500
			k_3	0,028
Mode	**k_R**	**k_{AR}**	**k_L**	**$P_{SUP\ M}$**
Planing	1,000	0,327	1,000	5,00
Displacement	1,230	0,402	1,000	5,00
Planing mode governs			$P_{SUP\ M}$	**5,00**

PANEL Dh2

b (mm)	900	L (mm)	2400	k_c
c (mm)	0	x (m)	5,50	1,000
L_{max} (mm)	2250	for A_D	A_D (m^2)	2,025
L_{max} (mm)	1888	for k_2	k_2	0,500
			k_3	0,028
Mode	**k_R**	**k_{AR}**	**k_L**	**$P_{SUP\ M}$**
Planing	1,000	0,327	1,000	5,00
Displacement	1,230	0,402	1,000	5,00
Planing mode governs			$P_{SUP\ M}$	**5,00**

Расчеты ламинирования панелей. Основа 20 мм пенопласта 60. Снаружи: 1 слой стекломата 600+ 1 слой стеклоткани 600. Изнутри: 1 слой стекломата 600.

Go To DECKHOUSE zone

DECKHOUSE STIFFENER 1 & 2 LAYUP SCHEDULE

Go To DECKHOUSE zone

Clear all entries

STIFFENER Dh1 — Zone — User decision

CORE/FORMER (INSIDE) DIMENSIONS		COVER LAMINATE (ONE SIDE ONLY)	
Crown width	50 mm	**Label**	**No. plies**
Core mterial PU 'former' or hollow		CSM600(S)	3
Depth	100 mm	WR600(S)	3
		None	0
Base width	50 mm	None	0

Attached plating	Sandwich	ADDITIONAL CROWN REINFORCEMENT	
		Label	**No. plies**
		None	0
Bond width both sides	50 mm		

ISO-12215-5 REQUIREMENT

Criterion	Required	Actual	CF	RESULT
Flexural strength (N.m)	2160	2454	1,14	PASSES
Shear strength (N)	5400	31480	5,83	PASSES
Stiffness (N.sq.m)	3240	31735	9,79	PASSES
Buckle: web t both sides	2,37	13,06	5,52	PASSES

Clear all entries

STIFFENER Dh2 — Zone — User decision

CORE/FORMER (INSIDE) DIMENSIONS		COVER LAMINATE (ONE SIDE ONLY)	
Crown width	50 mm	**Label**	**No. plies**
Core mterial PU 'former' or hollow		CSM600(S)	3
Depth	100 mm	WR600(S)	3
		None	0
Base width	50 mm	None	0

Attached plating	Sandwich	ADDITIONAL CROWN REINFORCEMENT	
		Label	**No. plies**
		None	0
Both width both sides	50 mm		

ISO-12215-5 REQUIREMENT

Criterion	Required	Actual	CF	RESULT
Flexural strength (N.m)	2160	2454	1,14	PASSES
Shear strength (N)	5400	31480	5,83	PASSES
Stiffness (N.sq.m)	3240	31735	9,79	PASSES
Buckle: web t both sides	2,37	13,06	5,52	PASSES

STIFF Dh1

s (mm)	900	L_u (mm)	2400	k_{cs}
c (mm)	0	x (m)	7,20	1,000
s_{min} (mm)	900	for A_D	A_D (m^2)	2,160
Mode	k_R	k_{AR}	k_L	$P_{SUP\,M}$
Planing	1,000	0,321	1,000	5,00
Displacement	0,520	0,250	1,000	5,00
Planing mode governs			$P_{SUP\,M}$	5,00

STIFF Dh2

s (mm)	900	L_u (mm)	2400	k_{cs}
c (mm)	0	x (m)	5,80	1,000
s_{min} (mm)	900	for A_D	A_D (m^2)	2,160
Mode	k_R	k_{AR}	k_L	$P_{SUP\,M}$
Planing	1,000	0,321	1,000	5,00
Displacement	0,520	0,250	1,000	5,00
Planing mode governs			$P_{SUP\,M}$	5,00

Расчеты ламинирования вертикальных стоек. Основа: 100 мм высотой и 50 мм шириной пенопласта 60. Ламинирование: 3+3 слоя стекломата 600 и стеклоткани 600. Полосы шириной 300-400 мм.