

Procedure of Direct Strength Analysis for Foremost and Aftermost Cargo Holds

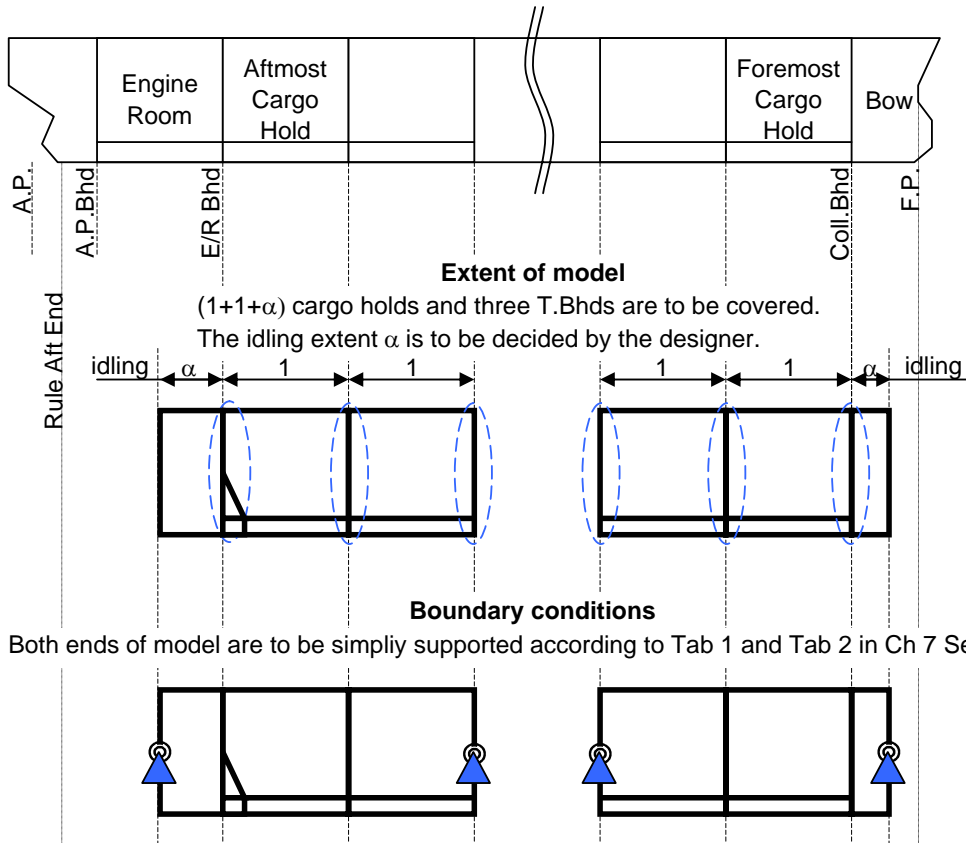


Table 1: Rigid-link of both ends

Nodes on longitudinal members at both ends of the model	Translational			Rotational		
	Dx	Dy	Dz	Rx	Ry	Rz
All longitudinal members	RL	RL	RL	-	-	-

RL means rigidly linked to the relevant degrees of freedom of the independent point

Table 2: Support condition of the independent point

Location of the independent point	Translational			Rotational		
	Dx	Dy	Dz	Rx	Ry	Rz
Independent point on aft end of model	-	Fix	Fix	Fix	-	-
Independent point on fore end of model	Fix	Fix	Fix	Fix	-	-

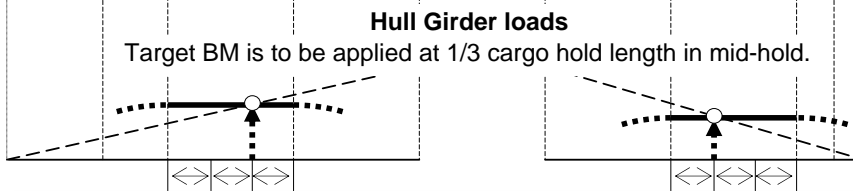


Table 3: Target loads for vertical bending moment analysis

Hull girder effect	Still water	Wave	Considered Location
Vertical bending moment	M_{SW}	$C_{WV} M_{WV}$	1/3 CH length from T.Bhd
Vertical shear force	0	0	1/3 CH length from T.Bhd
Horizontal bending moment	---	$C_{WH} M_{WH}$	1/3 CH length from T.Bhd
Horizontal shear force	---	0	1/3 CH length from T.Bhd

Table 4: Target loads for vertical shear force analysis

Hull girder effect	Still water	Wave	Location
Vertical bending moment	$0.8M_{SW}$	$0.65 C_{WV} M_{WV}$	Transverse bulkhead
Vertical shear force	Q_{SW}	Q_{WV}	Transverse bulkhead
Horizontal bending moment	---	0	Transverse bulkhead
Horizontal shear force	---	0	Transverse bulkhead

Standard Loading Conditions

Table 3: Bending moment analysis applicable to loaded hold in alternate condition of BC-A (mid-hold is loaded hold)

No.	Description ^{a)}	Draught	Loading Pattern for Aftmost CH	Loading Pattern for Foremost CH	Load Case (Design Wave)				Remarks (see below)
					Still water vertical bending moment ^{b)}				
5	Multi Port -2 ([3.3.2])	0.83T _s			F2	P1			3), 6)
					M _{SWH}	M _{SW,S}			
6	Multi Port -3 ([3.3.3])	0.67T _s			P1				3), 6)
					M _{SW,S}				
7	Multi Port -3 ([3.3.3])	0.67T _s			P1				3), 6)
					M _{SW,S}				
8	Multi Port -4 ([3.3.4])	0.75T _s			F2	R1	R1	P1	3), 6)
					M _{SWH}	M _{SWH}	M _{SW,S}	M _{SW,S}	
9	Multi Port -4 ([3.3.4])	0.75T _s			F2	R1	R1	P1	3), 6)
					M _{SWH}	M _{SWH}	M _{SW,S}	M _{SW,S}	
10	Alternate Load ([3.4.2])	T _s			F2	P1			2)
					M _{SWH}	0			
15	Harbour Condition -1 ([3.6.1])	0.67T _s			---	---			2), 15)
					M _{SW,P,H}	M _{SW,P,S}			
16	Harbour Condition -1 ([3.6.1])	0.67T _s			---	---			3), 14), 15)
					M _{SW,P,H}	M _{SW,P,S}			
17	Harbour Condition -1 ([3.6.1])	0.67T _s			---	---			3), 14), 15)
					M _{SW,P,H}	M _{SW,P,S}			
18	Harbour Condition -2 ([3.6.2])	0.67T _s			---	---			3), 14), 15)
					M _{SW,P,H}	M _{SW,P,S}			
19	Harbour Condition -2 ([3.6.2])	0.67T _s			---	---			3), 14), 15)
					M _{SW,P,H}	M _{SW,P,S}			

Table 4: Shear force analysis applicable to loaded hold of BC-A (mid-hold is loaded hold)

10SF	Alternate Load ([3.4.2])	T _s			F2				2), 7)
					0.8M _{SWH}				
					Q _{SW}				

Table 5: Bending moment analysis applicable to BC-B and BC-C

No.	Description ^{a)}	Draught	Loading Pattern for Aftmost CH	Loading Pattern for Foremost CH	Load Case (Design Wave)				Remarks (see below)
					Still water vertical bending moment ^{b)}				
5	Multi Port -2 ([3.3.2])	0.83T _s			F2	P1			4), 7)
					M _{SWH}	M _{SW,S}			
6	Multi Port -3 ([3.3.3])	0.67T _s			P1				4), 7)
					M _{SW,S}				
7	Multi Port -3 ([3.3.3])	0.67T _s			P1				4), 7)
					M _{SW,S}				
8	Multi Port -4 ([3.3.4])	0.75T _s			F2	R1	R1	P1	4), 7)
					M _{SWH}	M _{SWH}	M _{SW,S}	M _{SW,S}	
9	Multi Port -4 ([3.3.4])	0.75T _s			F2	R1	R1	P1	4), 7)
					M _{SWH}	M _{SWH}	M _{SW,S}	M _{SW,S}	
12	Harbour Condition -1 ([3.6.1])	0.67T _s			---	---			4), 12), 13)
					M _{S,P(+)}	M _{S,P(-)}			
13	Harbour Condition -1 ([3.6.1])	0.67T _s			---	---			4), 12), 13)
					M _{S,P(+)}	M _{S,P(-)}			
14	Harbour Condition -2 ([3.6.2])	0.67T _s			---	---			4), 12), 13)
					M _{S,P(+)}	M _{S,P(-)}			
15	Harbour Condition -2 ([3.6.2])	0.67T _s			---	---			4), 12), 13)
					M _{S,P(+)}	M _{S,P(-)}			

Table 6: Shear force analysis applicable to BC-B and BC-C

No.	Description ^{a)}	Draught	Loading Pattern	Aft	Mid	Fore	Load Case (Design Wave)				Remarks (see Table 5 above)
							Still water vertical bending moment ^{b)}				
							Still water shear force				
5SF	Multi Port -2 ([3.3.2])	0.83T _s					F2				4), 7), 8)
							0.8M _{SWH}				
							Q _{SW}				