Calculations for bilge system

Project :	01275 - Yun Yang I
Customer	Guangzhou Dredging Company, Ltd.
Classification society:	China Classification
Units	SI Metric units

Calculation of "BRT"

L = length between p.p	154,00	[m]
B = breadth	31,00	[m]
C = depth	12,20	[m]
Formula:	**19.414,27**	[ton]

$$BRT = \frac{L \times B \times C}{3}$$

according Part I chap 6 par 5 revision 2014

Calculation of main bilge line

d1 = nom. width main bilge line	**162,03**	[mm]
Min. dia ± 5 [mm]	**157,03**	[mm]
Nom. Pipe Size		[DN]
Outer Diameter		[mm]
Wall Thickness		[mm]
Inner diametre		[mm]

Formula:

$$d_1 = 25 + 1{,}68\sqrt{L \times (B + D)}$$

according Part I chap 6 par 5 revision 2014

Capacity bilge pump

Q1 Capacity of bilge pump	**40,00**	[m3/h]
d2 = nom. Dia selected bilge line		[cm]
v = speed in bilge pump		[m/s]

Formula:

$$Q_1 \geq x_1 \times d_1^2$$

$$v = \frac{Q_1}{\frac{1}{4} \times \pi \times d_2^2}$$

according Part I chap 6 par 5 revision 2014

System data

Volume flow rate: Q	1.42E-02	[m3/s]
Fluid	Sea water	
Density	1.033,00	[kg/m3]
Temperature	20,00	[°C]
Salinity	7,00	[g/kg]
Density	1.033,00	[kg/m3]
Total energy loss (System)	1,46E+00	[m]

Pipeline 1

General			
Norm	C100	Rev B	
DN	250	[mm]	
Inner diameter	245,21	[mm]	
Wall Roughness ε	4,60E-05	[m]	
Length	25	[m]	
Height difference	-10	[m]	
Area	47.224,38	[mm]	
Relative roughness	5.330,65	[-]	
L/D	102	[-]	
Flow velocity	0,25	[m/s]	
Velocity head	0,03	[m]	
Reynolds No	1,74E+05	[-]	
Flow velocity	0,25	[m/s]	
Velocity head	0,03	[m]	using eq A-3
Reynolds No	1,74E+05	[-]	using eq A-1
friction factor	1,92E-02	[-]	using eq A-7

Energy losses	**Energy loss**		**Qty.**	**K**
Pipe	1,10E-01	[m]	1	28,824
Entrance	1,26E-01		4	0,5
Bend	4,50E-01		4	0,136
Generic Gate valve	3,40E-02		3	0,3
EC278 Gate valve	1,20E-02		1	0,6
Total	**7,32E-01**			

Pipeline n

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Figure 13.42 Operating Point for Example Problem 13.4