NO	DATE	SHEET	MODIFICATION	BY

OWNER JASA ARMADA INDONESIA	PROJECT NAME **ASD HARBOUR TUG 2x2200 HP**	ISSUED DATE 23/08/2018
CLASS BKI	PROJECT NO **ABH18048** BUILDING NO **TB101/TB102/TB103/TB105**	DRAWN BY -
SHIPYARD PT. CITRA SHIPYARD	DRAWING TITLE **EQUIPMENT NUMBER CALCULATION**	DESIGNED BY FAH
		CHECKED BY SBJ
SCALE NTS		APPROVED BY TRI
SIZE A4	DRAWING NO **O - 11 - 101**	SHEET 1 of 3

REVISION: (0) 1 2 3 4 5

CITRA SHIPYARD
SHIP BUILDING & REPAIR

REGISTERED COMPANY WQA UKAS QUALITY MANAGEMENT
ISO 9001:2008 134
CERTIFICATE NUMBER : QS 2905

DESIGN CONSULTANT

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MAIN DIMENSION

L_{OA}	=	*32.00*	*m*
B	=	*11.60*	*m*
D	=	*5.10*	*m*
T	=	*3.80*	*m*
VS 100% MCR	=	*12*	*Knots*

A. EQUIPMENT NUMBER

Based on BKI rules for Hull 2017 Vol. II, Sect. 18.B - Equipment Numeral. However, for the determination of the "TUG" equipment numeral the term 2.h.B may be subtituted by the term.

Equiment Numeral (EN) obtained from the following equation :

$$EN = D2/3 + 2\,(a.B + \sum hi.bi) + A/10$$

Where :

D = *Moulded Displacement*
= ***788.14*** ton

B = *Moulded Breadth*
= ***11.60*** meter

a = *Distance in (m), from the summer load water-line amidships, to the upper deck at side*
= ***1.30*** meter

bi = *Disatance in (m) , breadth of the superstucture tier "i", considering only tiers with a breadth greater than B/4*

b1 = *7.20* meter
b2 = *3.00* meter
b3 = *3.38* meter

hi = *Sum of height in (m) of superstructures and deckhouses, measured on the centreline of each tier having a breadth grather than B/4.*

h1 = *3.50* meter
h2 = *1.35* meter
h3 = *2.90* meter

∑ bi.hi = ***39.05*** meter

A = *Area in (m2), in profile view of the hull, superstructure and houses, having a breadth graether than B/4, above the summer load waterline whithin the length L.*
= ***128*** meter2

EN = ***206*** *(intermediate 205-240)*

Note : *For intermediate values of equipment number, use equipment in sizes and weights given for the lower equipment number in the table 18.2 Anchor, Chain Cables & Ropes.*

EQUIPMENT NUMBER = ***206***

B. ANCHOR SPECIFICATION

Type	=	Stockless Bower Anchor	
Number	=	***2***	pcs *(C.1*)*
Mass per Anchor	=	***660***	kg
		495	kg *(C.4*)*

Note :
C.1. *Where in column 3 of Table 18.2 three bower anchors are required, the third anchor is intended as a spare bower anchor. Installation of the spare bower anchor on board is not required.*
C.4. *Where special anchors approved as "High Holding Power Anchors" are used, the anchor mass may be 75%*

C. CHAIN CABLES SPECIFICATION

Type	=	Grade 2 Stud Link Bower Chain	
Diameter	=	***22***	mm
Total Length	=	***302.5***	m

D. MOORING ROPES SPECIFICATION

Number	=	***4***	pcs
Length	=	***120***	m
Breaking Strenght	=	***65***	kN

E. ATTACHEMENT

> Table 18.2 Anchor, Chain Cable & Ropes

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Table 18.2 Anchor, Chain Cables and Ropes

No. for Reg.	Equipment numeral Z_1 or Z_2	Stockless anchor			Stud link chain cables						Recommended ropes				
		Bower anchor		Stream anchor	Bower anchors				Stream wire or chain for stream anchor		Towline		Mooring ropes		
		Number [1]	Mass per anchor		Total length	Diameter d_1	Diameter d_2	Diameter d_3	Length	Break load [2]	Length	Break load [2]	Number	Length	Break load [2]
			[kg]		[m]	[mm]	[mm]	[mm]	[m]	[kN]	[m]	[kN]		[m]	[kN]
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
101	up to 50	2	120	40	165	12.5	12.5	12.5	80	65	180	100	3	80	35
102	50 – 70	2	180	60	220	14	12.5	12.5	80	65	180	100	3	80	35
103	70 – 90	2	240	80	220	16	14	14	85	75	180	100	3	100	40
104	90 – 110	2	300	100	247.5	17.5	16	16	85	80	180	100	3	110	40
105	110 – 130	2	360	120	247.5	19	17.5	17.5	90	90	180	100	3	110	45
106	130 – 150	2	420	140	275	20.5	17.5	17.5	90	100	180	100	3	120	50
107	150 – 175	2	480	165	275	22	19	19	90	110	180	100	3	120	55
108	175 – 205	2	570	190	302.5	24	20.5	20.5	90	120	180	110	3	120	60
109	205 – 240	3	660		302.5	26	22	20.5			180	130	4	120	65
110	240 – 280	3	780		330	28	24	22			180	150	4	120	70
111	280 – 320	3	900		357.5	30	26	24			180	175	4	140	80
112	320 – 360	3	1020		357.5	32	28	24			180	200	4	140	85
113	360 – 400	3	1140		385	34	30	26			180	225	4	140	95
114	400 – 450	3	1290		385	36	32	28			180	250	4	140	100
115	450 – 500	3	1440		412.5	38	34	30			180	275	4	140	110
116	500 – 550	3	1590		412.5	40	34	30			190	305	4	160	120
117	550 – 600	3	1740		440	42	36	32			190	340	4	160	130
118	600 – 660	3	1920		440	44	38	34			190	370	4	160	145
119	660 – 720	3	2100		440	46	40	36			190	405	4	160	160
120	720 – 780	3	2280		467.5	48	42	36			190	440	4	170	170
121	780 – 840	3	2460		467.5	50	44	38			190	480	4	170	185
122	840 – 910	3	2640		467.5	52	46	40			190	520	4	170	200
123	910 – 980	3	2850		495	54	48	42			190	560	4	170	215
124	980 – 1060	3	3060		495	56	50	44			200	600	4	180	230
125	1060 – 1140	3	3300		495	58	50	46			200	645	4	180	250
126	1140 – 1220	3	3540		522.5	60	52	46			200	690	4	180	270
127	1220 – 1300	3	3780		522.5	62	54	48			200	740	4	180	285
128	1300 – 1390	3	4050		522.5	64	56	50			200	785	4	180	305