CONCEPT NAVAL
EXPERTS-CONSEILS | GÉNIE MARITIME

FILED BY ABS FOR REFERENCE ONLY

SPEEDCRANE DERRICK HOIST REPLACEMENT ANALYSIS

MARTHA L. BLACK | ICE BREAKER

For

Pêches et Océans Canada | Fisheries and Oceans Canada
Garde côtière | Coast Guard

Québec, June 18, 2020
Document no: C20-14-009-01-R1 Speedcrane derrick hoist replacement analysis

25, RUE DU MARCHÉ-CHAMPLAIN, #101, QUÉBEC, QC G1K 4H2
@: INFO@CONCEPTNAVAL.COM T.: 418.692.1524 F.: 418.692.1527 W.: CONCEPTNAVAL.COM

Client

RICHARD BOURDEAU
AGENT DE PROJET
PROGRAMME NATIONAL D'EXTENSION DE VIE DES NAVIRES
SERVICES TECHNIQUES INTÉGRÉS
GARDE CÔTIÈRE CANADIENNE
200 KENT, OTTAWA

Document

C20-14-009-01 R1 Speedcrane derrick hoist replacement analysis

Description of revisions

Rev	Date	Description	Done by	Approved by
0	2020-06-18	Original document	H.R.	H. Royer, ing.
1	2020-07-24	Design change for lead block bracket and supporting structure	H.R.	H. Royer, ing.

Table of contents

Table of Appendixes

1 Introduction

The Speedcrane derrick actually installed on the Martha L. Black has a global safe working loaf (SWL) of 28 metric tonnes. It is fitted with 3 hoists;

A 20t SWL hoist
A 8t SWL hoist
A 5t SWL hoist

Concept Naval was mandated to conduct a feasibility study to replace the 5t hoist by a 8t hoist. This implies the validation of;

- The main boom increased load and acceptability of stresses.
- The head block bracket on main boom. (block # 21)
- The heel block attachment structure on main boom. (block # 20)
- The lead block bracket and backup structure on wheelhouse top. (block # 19)
- The supporting structure in way of the winch on lower deck.

2 Assumptions

To determine the loads for this analysis, the design parameters as found in the crane manual, *Job No. 1DG 6030-33*, where assumed;

- The crane can be operated at a maximum sea state of Beaufort 3 corresponding to a maximum wave height of 1.2m
- The global crane SWL remains at 28t.
- Only two(2) of the hoist can be used simultaneously; 20t with the 8t or 20t with the 5t.
- The de-rating according to sea waves height as described on Transport Canada Certificate no. *R34043-7097* still applies.

The structural validation was conducted to be in accordance with the *ABS Guide for Certification of Lifting Appliances*. The crane is treated as a *Shipboard crane* with the relevant amplification factors.

- No accumulated ice load has been considered.

3 Analysis results

3.1 Compliance of boom structure and block brackets

The main boom, including the structural brackets for the auxiliary hoist head block no.21 were found with acceptable induced stresses under the relevant loads.

The heel block no. 20 supporting structure was not analysed but is identical in design and located at the same location along the boom as the heel block no. 7 which is design for a 8t SWL hoist on the port side of the boom. The strength of the bracket structure is then considered acceptable. It is however to be noted that the block no.20 itself was not analysed by Concept Naval. If it cannot be confirmed suitable for the increased load of 8t (axle, sheave, etc.) then the block shall be replaced with a certified one.

The upper bracket supporting the lead pulley block no. 19 just above wheelhouse top is found too weak to support the increased load such as the backup structure inside the top box and these need some replacement and reinforcements. The detail of the modifications can be found on drawing C20-14-160-01 R1 Sheets 4 and 5.

3.2 Pulley blocks, swivels and gear.

Many diameters or material grade of existing equipment could not be verified by a visual inspection. All related pulleys are to be confirmed adequate for the increased safe working load of 8.0 tones or shall be replaced (entirely or individual parts) with certified ones including all connecting gears, swivels, sheaves, axles, pins.

3.3 Foundation for the winch

In terms of strength, the existing seat and the local deck structure already in place for the 5t auxiliary hoist winch is suitable for the increased load of 8t. Supporting calculation are shown in Annexe A

It is also understood that the actual winch housing can be reused as being suitable for the increased load. Replacement of different gears and parts are assumed to be the only structural modification required for the winch part. This is out of Concept Naval scope.

4 conclusion

Our analysis has revealed that the strength of the existing boom and block supporting brackets are adequate for the increased load of 8t on the whip hoist with the exception of the top lead block bracket and support structure that requires reinforcement. This is assuming the assumptions stated in this report are valid.

Concept Naval did not make any selection of replacement equipment neither did validate whether existing gear are adequate for any updated cable diameter. Also, the feasibility of converting the hoist winch from a 5t capacity to an 8t capacity was not validated.

Annexe A

Structural Calculation Details

ABS Guide for Certification of Lifting Appliances

	Sea state 3				
	Significant wave height	Hs	1.2	1.2	m
	Hoist description		Whip	Main	
	Position along boom		17.374	21.184	m
	Safe working load	SWL	8	20	t
	Live load	LL	78.48	196.2	kN
	Boom angle		20	20	degrees from horizontal
2-2/5.17	vertical acceleration	a_v	0.070	0.070	g
2-2/5.17	horizontal acceleration	a_h	0.045	0.045	g
					g
2-2/5.17	Dead load vertical factor		1.070	1.070	
2-2/5.17	Dead load horizontal factor		0.045	0.045	
	Combined dead load factor		1.071	1.071	
2-2/7.3	Live load vertical factor	VAF	1.300	1.300	Considering as a shipboard crane
2-2/5.17	Live load horizontal factor		0.045	0.045	
	Combined live load factor		1.301	1.301	
	Live load considered		10.41	26.02	t
	Cos20° component		0.940	0.940	
	Sin20° component		0.342	0.342	t
	Max force along boom		14.0	34.9	
	Force component lateral to boom		9.78	24.45	
	Moment w/r boom pivot		169.9	517.9	tm
	Total moment			687.8	tm
	Lateral component topping cables			32.5	t
	Angle of topping cables with boom			33	deg
	Component of topping along boom			50.0	t
	Max axial force along boom			98.9	t

Block #20 bracket attach point under boom.

Considered length of weld	450	mm	
Weld troath	8.98	mm	
Distance between welds	210	mm	
Weld shear area	8081	mm²	
Sec. mod. weld connect. to boom	589857	mm³	
Force along boom	137001	N	
Lever	199	mm	
Bending stress (shear in welds)	46.2	N/mm²	
Pure shear along boom	17.0	N/mm²	
Total shear in welds	63.2	N/mm²	
Allowable shear stress	99.2	N/mm²	

CONCEPT NAVAL
EXPERTS-CONSEILS | GÉNIE MARITIME

Projet / description : Boom tube stress calculation; Boom Angle from horizontal : 20°

Données

Portée de la poutre : L 21.184 m — Type de Poutre :
Support intermédiaire : L' m — Supportée - Supportée

Charges et moments ponctuels

a (m)	17.374	21	21.18							
Charge F (t)	9.78									
Moment M (tm)	-6.40	-17.6	13.7							

Charge Distribuée n°1	
Charge totale P (t)	5.82
a (m)	10.592
x1 (m)	0
x2 (m)	21.184
Charge répartie F1 (t/m)	
Charge répartie F2 (t/m)	

Charge Distribuée n°2	
Charge P (t)	0
a (m)	
x1 (m)	
x2 (m)	
F1(t)	
F2(t)	

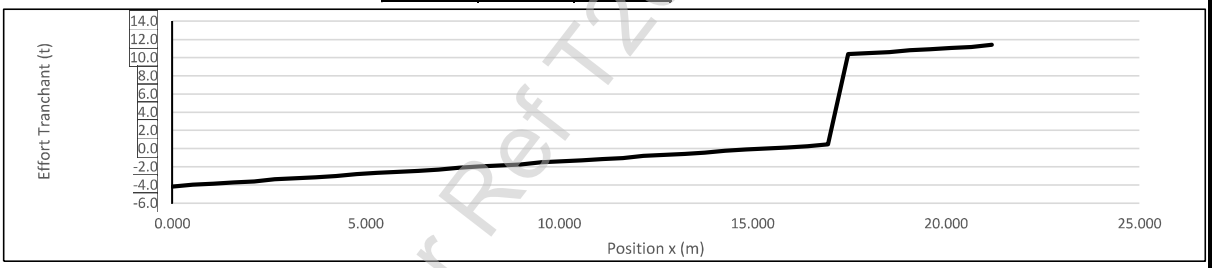
Type de raidisseur : Round tube — OD: 666 ID: 634

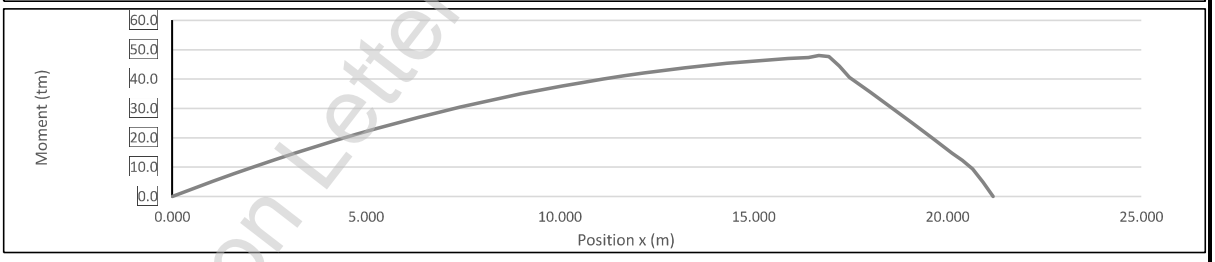
Module d'Young du matériel E 200000 N/mm2

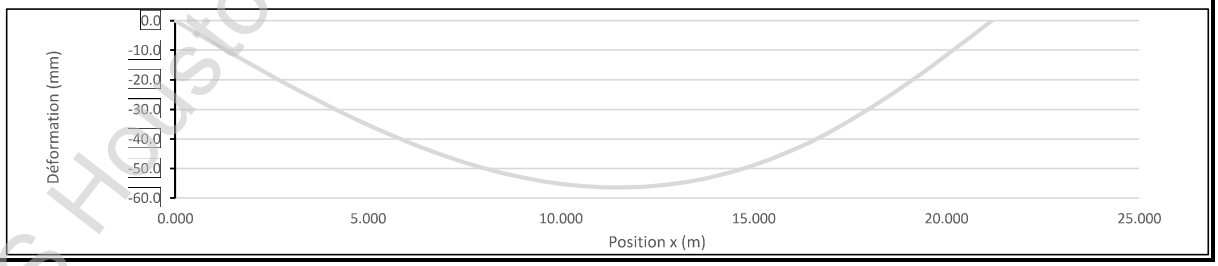
Résultats

Aire totale (tôle et raidisseur) : A	32673	mm²	Hauteur de l'âxe neutre : NA	0.0	mm
Aire résistant au cisaillement : AC	32673	mm²	Intertie p/r à l'axe neutre : Ixx	172657	cm⁴
Poids linéaire	0.0	kg/m	Section module : SM	5184.9	cm³
avec tôle associée	0.0	kg/m			

Moment de flexion maximum	Abs(BM)	47.69	tm
Effort tranchant maximum	Abs(V)	11.41	tonnes
Moment à gauche	M1	0.00	tm
Moment à droite	M2	0.00	tm
Réaction à gauche	R1	-4.18	tonnes
Réaction à droite	R2	11.41	tonnes
Déformation maximale	Abs(Y)	56.42	mm







		Actual	Allowable	
Assumed steel yield resistance	σ_y	248		N/mm²
Axial load	F_{axial}	969950		N
Axial stress	σ_{axial}	29.7		N/mm²
Contrainte de flexion	$\sigma_{bending}$	90.2	148.8	N/mm²
Contrainte de cisaillement	τ	3.4	99.2	N/mm²
Total normal stress	σ_{total}	119.9	148.8	N/mm²
Combined stress	σ_{comb}	120.1	186	N/mm²

ABS Guide for Certification of Lifting Appliances

	Sea state 3				
	Significant wave height	Hs	1.2	1.2	m
	Hoist description		Whip	Main	
	Position along boom		17.374	21.184	m
	Safe working load	SWL	8	20	t
	Live load	LL	78.48	196.2	kN
	Boom angle		70	70	degrees from horizontal
2-2/5.17	vertical acceleration	a_v	0.070	0.070	g
2-2/5.17	horizontal acceleration	a_h	0.045	0.045	g
					g
2-2/5.17	Dead load vertical factor		1.070	1.070	
2-2/5.17	Dead load horizontal factor		0.045	0.045	
	Combined dead load factor		1.071	1.071	
2-2/7.3	Live load vertical factor	VAF	1.300	1.300	Considering as a shipboard crane
2-2/5.17	Live load horizontal factor		0.045	0.045	
	Combined live load factor		1.301	1.301	
	Live load considered		10.41	26.02	t
	Cos70° component		0.342	0.342	
	Sin70° component		0.940	0.940	t
	Max force along boom		20.2	50.5	
	Force component lateral to boom		3.56	8.90	
	Moment w/r boom pivot		61.8	188.5	tm
	Total moment			250.3	tm
	Lateral component topping cables			11.8	t
	Angle of topping cables with boom			12.6	deg
	Component of topping along boom			52.9	t
	Max axial force along boom			123.5	t

Block #20 bracket attach point under boom.

Considered length of weld	450	mm	
Weld troath	8.98	mm	
Distance between welds	210	mm	
Weld shear area	8081	mm^2	
Sec. mod. weld connect. to boom	589857	mm^3	
Force along boom	198015	N	
Lever	199	mm	
Bending stress (shear in welds)	66.8	N/mm^2	
Pure shear along boom	24.5	N/mm^2	
Total shear in welds	91.3	N/mm^2	
Allowable shear stress	99.2	N/mm^2	

CONCEPT NAVAL
EXPERTS-CONSEILS | GÉNIE MARITIME

Projet / description : Boom tube stress calculation; Boom Angle from horizontal : 70°

Données

Portée de la poutre : L 21.184 m — Type de Poutre :
Support intermédiaire : L' m — Supportée - Supportée

Charges et moments ponctuels

a (m)	17.374	21	21.18							
Charge F (t)	3.56									
Moment M (tm)	-9.24	-25.5	14.5							

Charge Distribuée n°1	
Charge totale P (t)	5.82
a (m)	10.592
x1 (m)	0
x2 (m)	21.184
Charge répartie F1 (t/m)	
Charge répartie F2 (t/m)	

Charge Distribuée n°2	
Charge P (t)	0
a (m)	
x1 (m)	
x2 (m)	
F1(t)	
F2(t)	

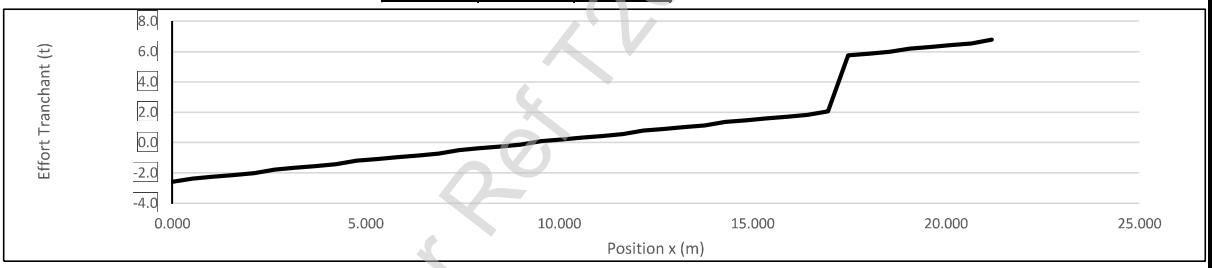
Type de raidisseur : Round tube — OD: 666 ID: 634

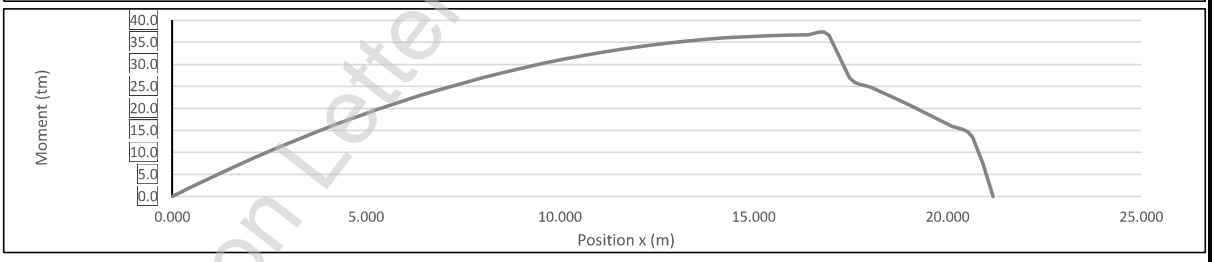
Module d'Young du matériel E 200000 N/mm2

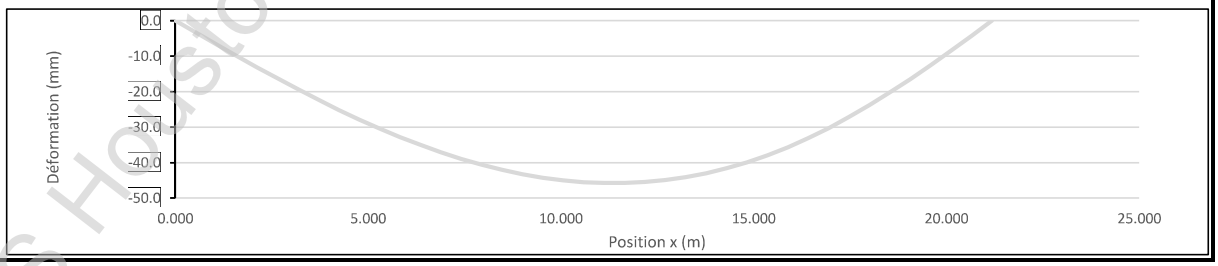
Résultats

Aire totale (tôle et raidisseur) : A	32673	mm²	Hauteur de l'âxe neutre : NA	0.0	mm
Aire résistant au cisaillement : AC	32673	mm²	Intertie p/r à l'axe neutre : Ixx	172657	cm^4
Poids linéaire	0.0	kg/m	Section module : SM	5184.9	cm^3
avec tôle associée	0.0	kg/m			

Moment de flexion maximum	Abs(BM)	36.69	tm
Effort tranchant maximum	Abs(V)	6.78	tonnes
Moment à gauche	M1	0.00	tm
Moment à droite	M2	0.00	tm
Réaction à gauche	R1	-2.60	tonnes
Réaction à droite	R2	6.78	tonnes
Déformation maximale	Abs(Y)	45.76	mm







Assumed steel yield resistance σ_y	248		N/mm²
Axial load F_{axial}	1211668		N
	Actual	Allowable	
Axial stress σ_{axial}	37.1		N/mm²
Contrainte de flexion $\sigma_{bending}$	69.4	148.8	N/mm²
Contrainte de cisaillement τ	2.0	99.2	N/mm²
Total normal stress σ_{total}	106.5	148.8	N/mm²
Combined stress σ_{comb}	106.6	186	N/mm²

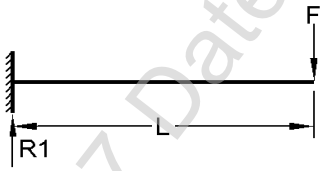
CONCEPT NAVAL
EXPERTS-CONSEILS | GÉNIE MARITIME

Lead block no.19 bracket connection at top box

Nominal tension		8.0	tonnes
dynamic factor		1.301	
loss per pulley		3	%
Tension in hoist side wire		11.0	tonnes
Tension in winch side wire		11.3	tonnes

Données de la poutre

Longueur de la poutre	L	0.7	m
Force totale appliquée	F	22.38	tonnes
Module d'Young du matériel	E	200000	N/mm2
Moment de flexion maximum	BM	15.7	tm
Effort tranchant maximum	V	22.4	tonnes
Moment à gauche	M1	15.7	tm
Moment à droite	M2	0.0	tm
Réaction à gauche	R1	22.4	tonnes
Réaction à droite	R2	0.0	tonnes



Encastré-libre force ponctuelle

Type de raidisseur — Poutre construite

Dimension de la tôle associée	375	x	10	mm	Assuming weld area only
Dimension de l'âme	500	x	10	mm	See C20-14-601-01 Sheet 4
Dimension du fer plat	375	x	10	mm	

Aire totale (tôle et raidisseur)	A	12500	mm²	Hauteur de l'âxe neutre	NA	250.0	mm
Aire résistant au cisaillement	Ac	5200	mm²	Intertia p/r à l'axe neutre	Ixx	59192	cm^4
Poids linéaire		68.3	kg/m	Section module	SM	2276.6	cm^3
avec tôle associée		97.5	kg/m	Déflexion maximale	D	0.212	mm

Contrainte de flexion	σ	**67.5**	**MPa**	Allowed **157.5** N/mm²
Contrainte de cisaillement	τ	**42.2**	**MPa**	Allowed **91.3** N/mm²
Combined stress	σ	**99.5**	**MPa**	

Vertical distance between flange plates: 500 mm

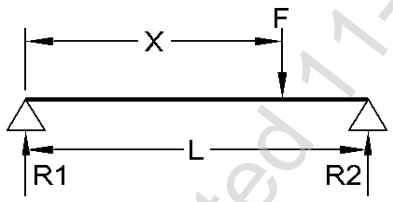
Couple developed horizontal tension/compression at top and bottom flange plates: 31.3 tonnes

CONCEPT NAVAL
EXPERTS-CONSEILS | GÉNIE MARITIME

Vertical frame I.W.O. lead block no.19 bracket

Données de la poutre

Longueur de la poutre	L	0.975	m
Force totale appliquée	F	31.3	tonnes
Localisation de la force	X	0.515	m
Module d'Young du matériel	E	200000	N/mm2
Moment de flexion maximum	BM	7.6119	tm
Effort tranchant maximum	V	16.548	tonnes
Moment à gauche	M1	0	tm
Moment à droite	M2	0	tm
Réaction à gauche	R1	14.78	tonnes
Réaction à droite	R2	16.548	tonnes



Simple-simple force ponctuelle

Type de raidisseur — Poutre Construite

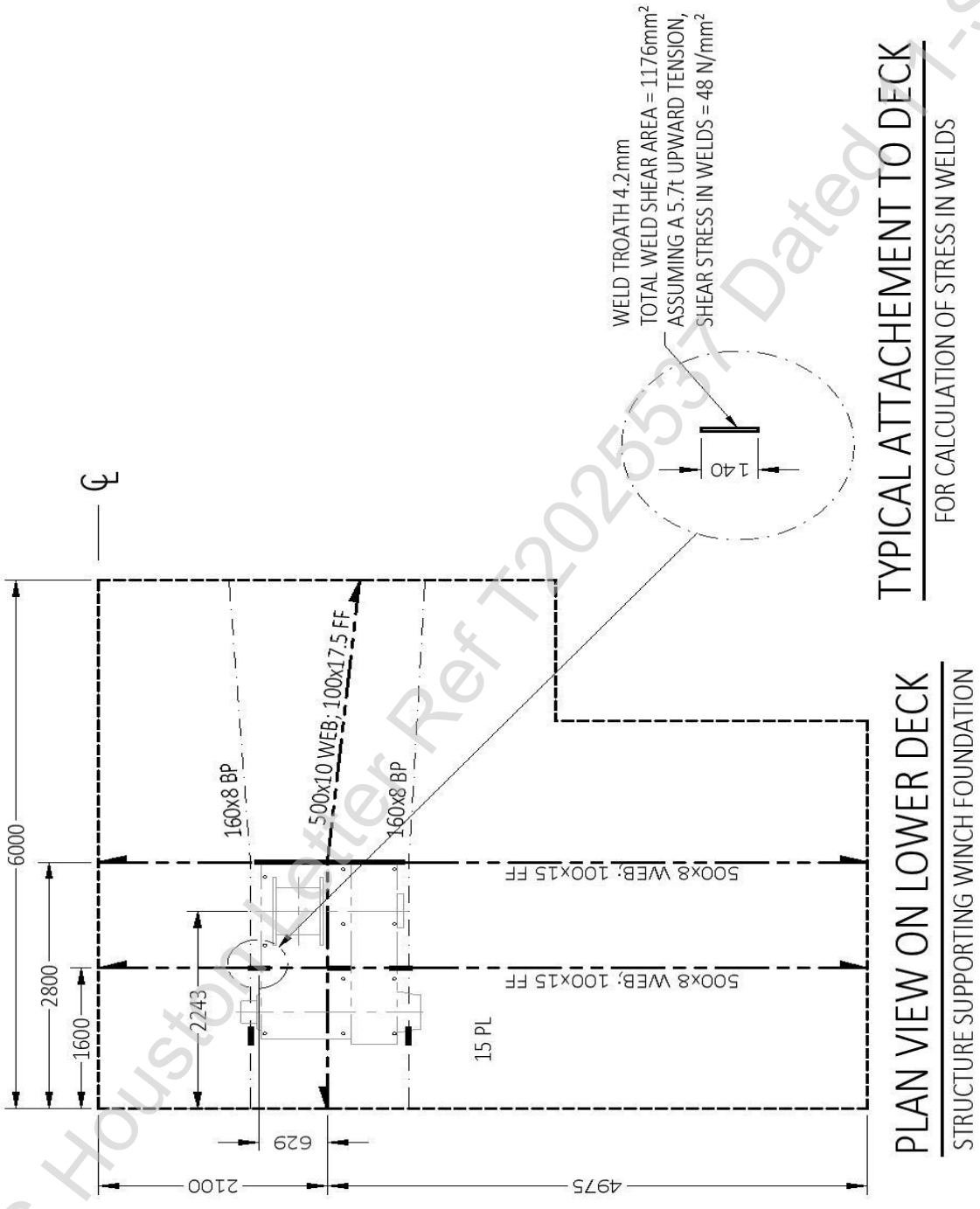
Dimension de la tôle associée	195	11	mm
Dimension de l'âme	205	20	mm
Dimension du fer plat	70	30	mm

Aire totale (tôle et raidisseur)	A	8345	mm²	Hauteur de l'âxe neutre	NA	104.3	mm
Aire résistant au cisaillement	Ac	4920	mm²	Intertia p/r à l'axe neutre	Ixx	6852	cm^4
Poids linéaire		48.4	kg/m	Section module	SM	524.3	cm^3
avec tôle associée		65.1	kg/m	Déflexion maximale	D	0.430	mm

Contrainte de flexion	σ	**142.4**	**MPa**
Contrainte de cisaillement	τ	**33.0**	**MPa**
Combined stress	σ	**153.5**	**MPa**

Allowed **157.5** N/mm²

Lower deck structure in way of winch foundation



Refer to drawing C20-14-601-01 Sheet 7 for details of winch foundation

CONCEPT NAVAL
EXPERTS-CONSEILS | GÉNIE MARITIME

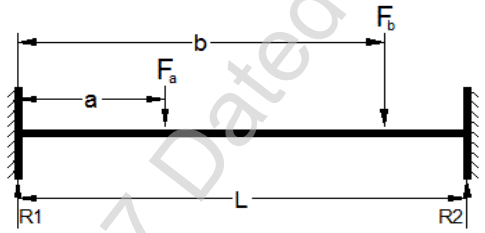
Girder at 2100 stbd of CL

Assuming total load from lead cable is distributed equaly on CL girder at both transverse beam location

Total load from lead cable		11.3	tonnes

Données de la poutre

Longueur de la poutre	L	6.0	m
Force appliquée en "a"	F_a	5.7	tonnes
Force appliquée en "b"	F_b	5.7	tonnes
Localisation de la force "F_a"	a	1.6	m
Localisation de la force "F_b"	b	2.8	m
Module d'Young du matériel	E	200000	N/mm2



Encastré-encastré 2 Forces non-égales

Moment de flexion maximum	BM	9.398	tm
Effort tranchant maximum	V	7.797	tonnes
Moment à gauche	M1	9.398	tm
Moment à droite	M2	-5.728	tm
Réaction à gauche	R1	7.797	tonnes
Réaction à droite	R2	3.548	tonnes

Type de raidisseur: Poutre Construite

Dimension de la tôle associée	1200	x	15	mm
Dimension de l'âme	500	x	10	mm
Dimension du fer plat	100	x	17.5	mm

Aire totale (tôle et raidisseur)	A	24750	mm^2	Hauteur de l'âxe neutre	NA	81.0	mm
Aire résistant au cisaillement	Ac	5325	mm^2	Intertia p/r à l'axe neutre	Ixx	70853	cm^4
Poids linéaire		52.7	kg/m	Section module	SM	1623.3	cm^3
avec tôle associée		193.1	kg/m	Déflexion maximale	D	-0.689	mm

Contrainte de flexion	σ	**56.8 MPa**
Contrainte de cisaillement	τ	**14.4 MPa**

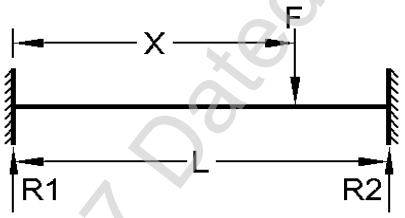
Transverse beam under winch foundation

Assuming halt the total load from lead cable is concentrated on each transverse beam at 629 from girder connection

Total load from lead cable 11.3 tonnes

Données de la poutre

Longueur de la poutre	L	2.1	m
Force totale appliquée	F	5.7	tonnes
Localisation de la force	X	0.629	m
Module d'Young du matériel	E	200000	N/mm2



Encastré-encastré force ponctuelle

Moment de flexion maximum	BM	1.7507	tm
Effort tranchant maximum	V	4.4505	tonnes
Moment à gauche	M1	1.7507	tm
Moment à droite	M2	0.7486	tm
Réaction à gauche	R1	4.4505	tonnes
Réaction à droite	R2	1.2218	tonnes

Type de raidisseur Poutre Construite

Dimension de la tôle associée	420	x	15	mm
Dimension de l'âme	500	x	8	mm
Dimension du fer plat	100	x	15	mm

Aire totale (tôle et raidisseur)	A	11800	mm²	Hauteur de l'âxe neutre	NA	145.3	mm
Aire résistant au cisaillement	Ac	4240	mm²	Intertia p/r à l'axe neutre	Ixx	47120	cm^4
Poids linéaire		42.9	kg/m	Section module	SM	1274.4	cm^3
avec tôle associée		92.0	kg/m	Déflexion maximale	D	0.998	mm

Contrainte de flexion	σ	**13.5 MPa**
Contrainte de cisaillement	τ	**10.3 MPa**

CONCEPT NAVAL
EXPERTS-CONSEILS | GÉNIE MARITIME

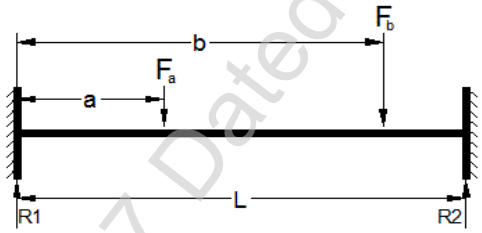
Winch seat girder (span under cable drum)

Assuming total load from lead cable is distributed equaly on 2 bolts within this span

Total load from lead cable 11.3 tonnes

Données de la poutre

Longueur de la poutre	L	1.6	m
Force appliquée en "a"	F_a	5.7	tonnes
Force appliquée en "b"	F_b	5.7	tonnes
Localisation de la force "F_a"	a	0.256	m
Localisation de la force "F_b"	b	1.031	m
Module d'Young du matériel	E	200000	N/mm2



Encastré-encastré 2 Forces non-égales

Moment de flexion maximum	BM	1.764 tm
Effort tranchant maximum	V	6.925 tonnes
Moment à gauche	M1	1.764 tm
Moment à droite	M2	-1.535 tm
Réaction à gauche	R1	6.925 tonnes
Réaction à droite	R2	4.420 tonnes

Type de raidisseur Poutre Construite

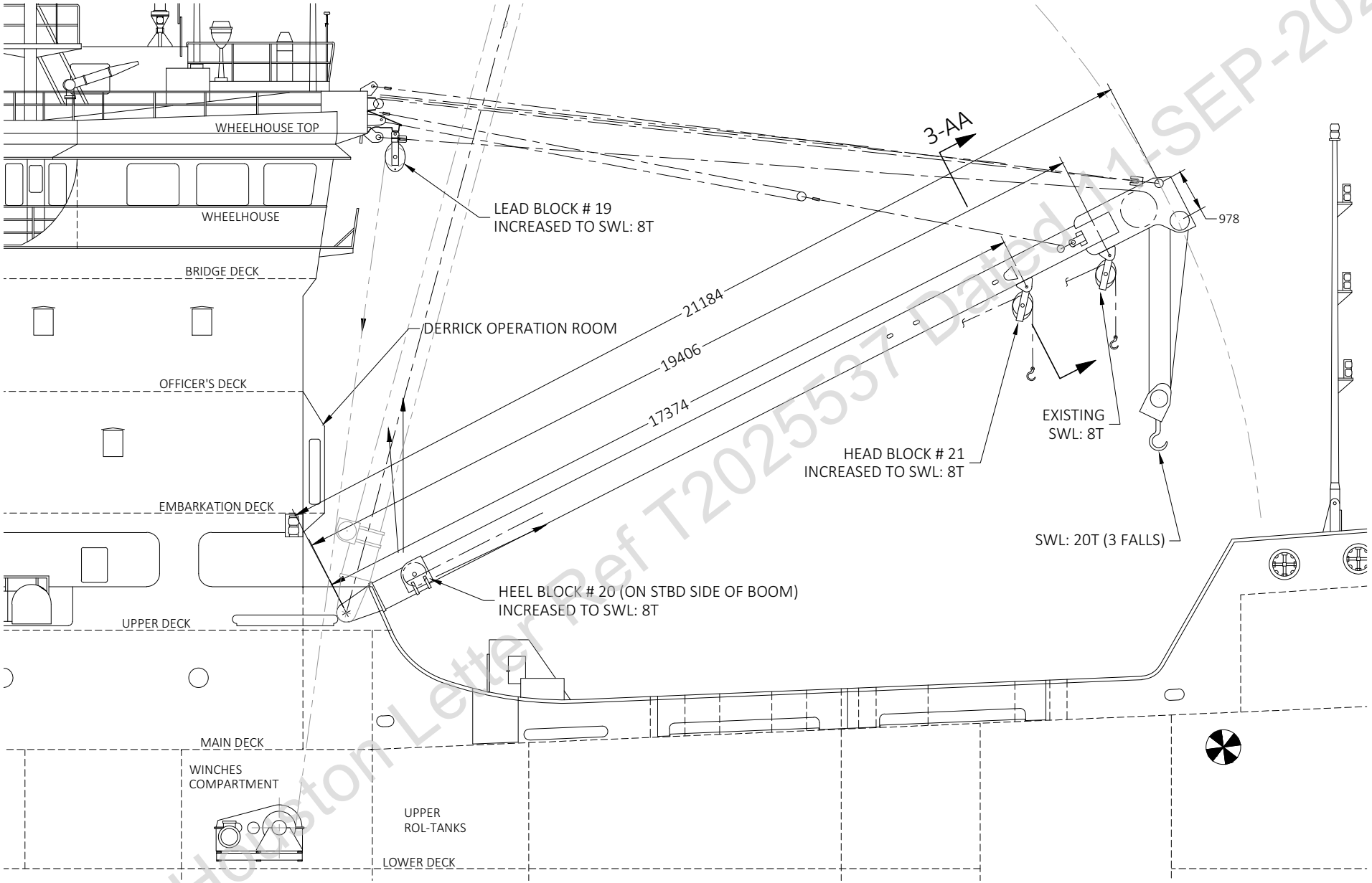
Dimension de la tôle associée	320	x	15	mm	For section refer to; C20-14-601-01
Dimension de l'âme	172	x	10	mm	C20-14-601-01 Sheet 7
Dimension du fer plat	137	#	25	mm	

Aire totale (tôle et raidisseur)	A	9945	mm²	Hauteur de l'âxe neutre	NA	74.8	mm
Aire résistant au cisaillement	Ac	2120	mm²	Intertia p/r à l'axe neutre	Ixx	7845	cm^4
Poids linéaire		40.1	kg/m	Section module	SM	642.0	cm^3
avec tôle associée		77.6	kg/m	Déflexion maximale	D	-0.079	mm

Contrainte de flexion	σ	**27.0 MPa**
Contrainte de cisaillement	τ	**32.0 MPa**

Annexe B

Increase Hoist 5T to 8T Support Drawing



GENERAL PROFILE VIEW

SCALE 1:125

NOTES

1. REFER TO ANALYSIS REPORT C20-14-009-01 FOR MORE DETAILS ON THE CONVERSION FEASIBILITY

CLIENT/CLIENT: CANADIAN COAST GUARD

PROJET/PROJECT: MARTHA L. BLACK DERRICK

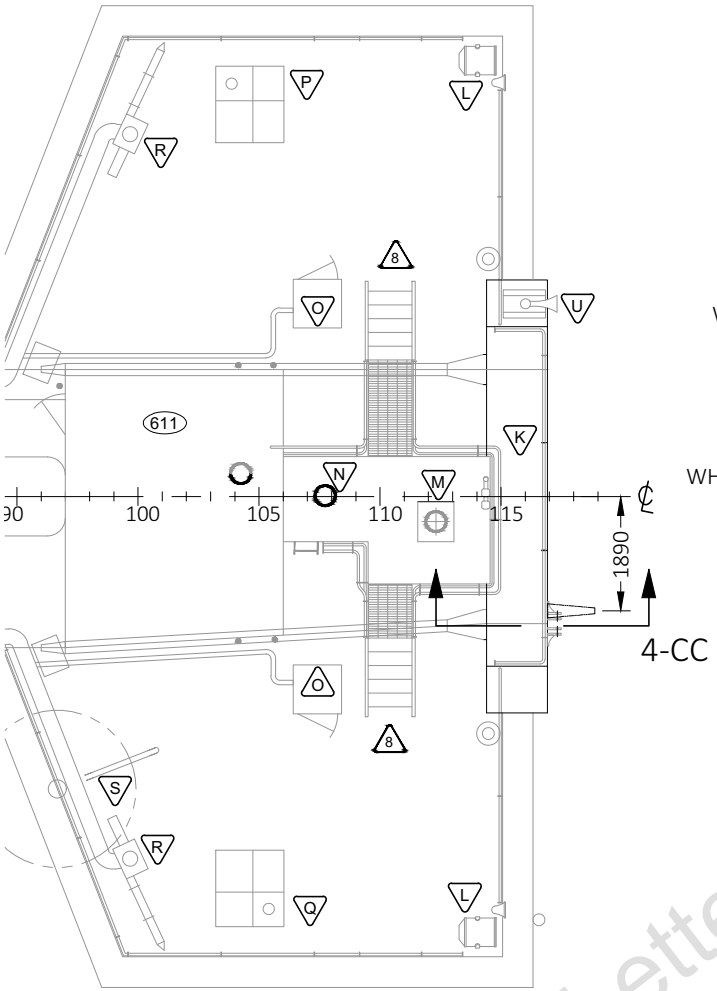
TITRE/TITLE: INCREASE HOIST 5T TO 8 T

NO. DESSIN/DWG. NB:	REV.	DESSINÉ/DRAWN:	FEUIL./SHT
C20-14-601-01	1	T.C. / H.R.	1 / 7

PRELIMINARY

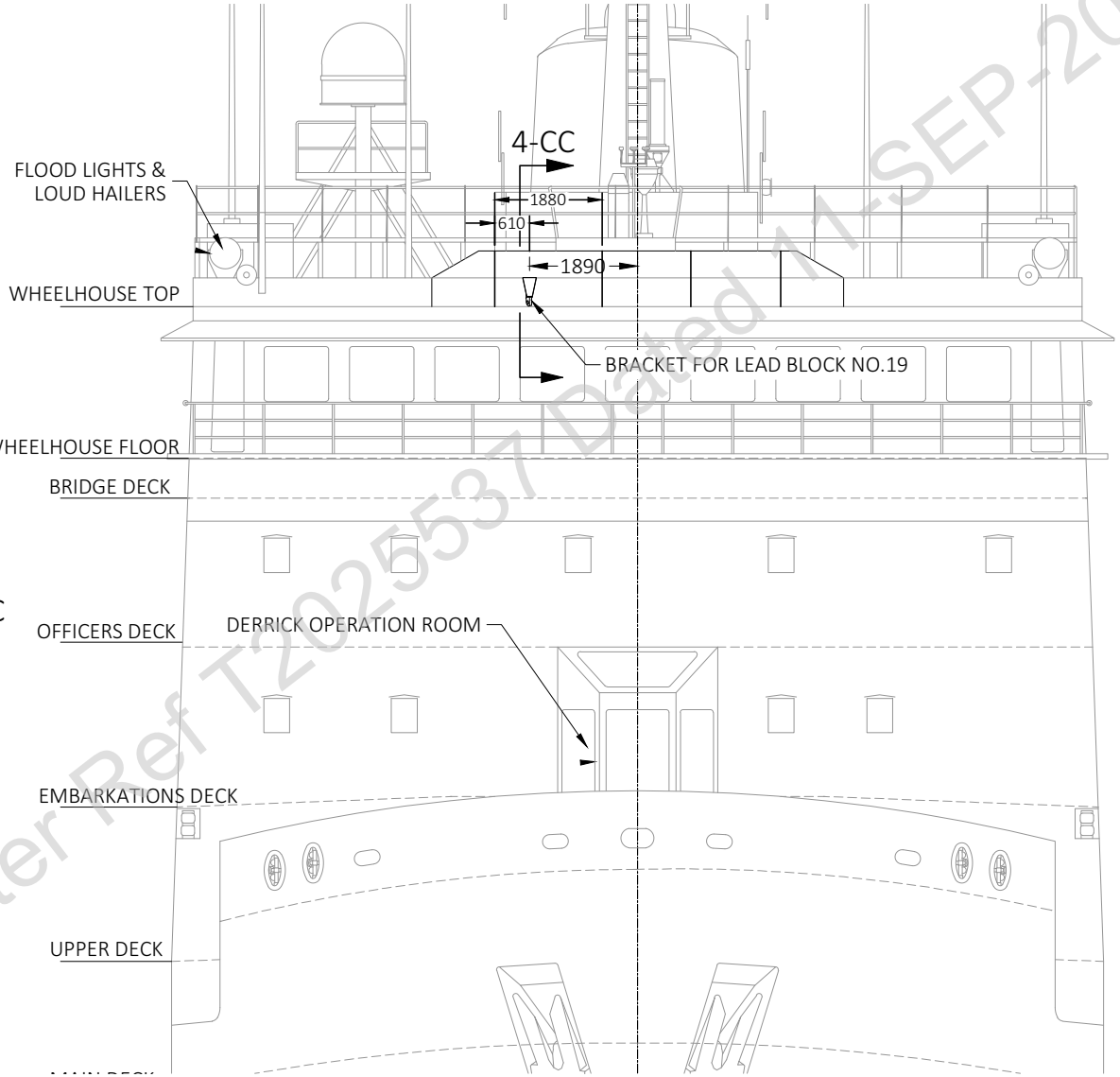
PRECISE MESUREMENTS TO BE DONE ONBOARD

CONCEPT NAVAL
EXPERTS-CONSEILS | GÉNIE MARITIME



PLAN VIEW ON WHEELHOUSE TOP

SCALE 1:125



FRONT VIEW OF DECKHOUSE

SCALE 1:125

CLIENT/CLIENT: CANADIAN COAST GUARD

PROJET/PROJECT: MARTHA L. BLACK DERRICK

TITRE/TITLE: INCREASE HOIST 5T TO 8 T

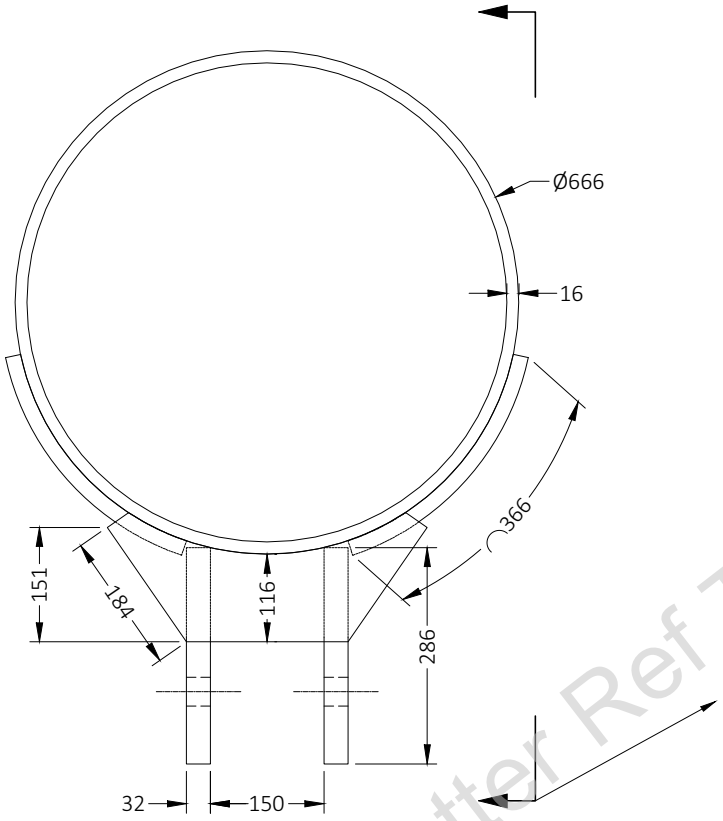
NO. DESSIN/DWG. NB: C20-14-601-01 | REV.: 1 | DESSINÉ/DRAWN: T.C. / H.R. | FEUIL./SHT: 2 / 7

PRELIMINARY

PRECISE MESUREMENTS TO BE DONE ONBOARD

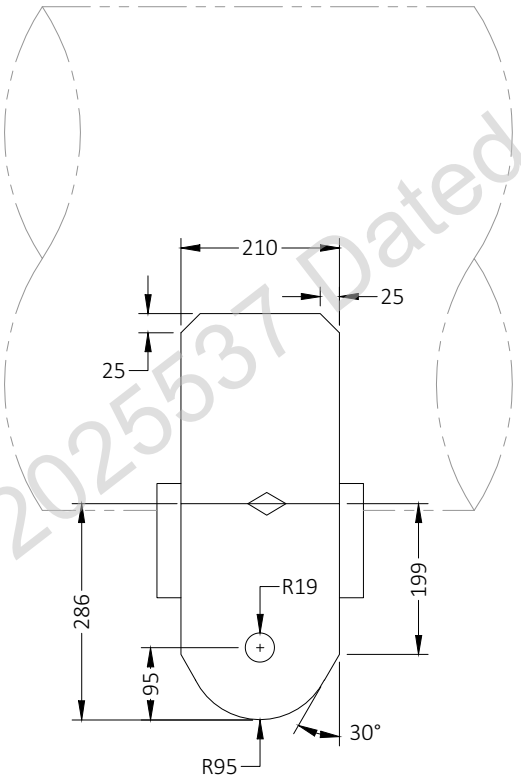
CONCEPT NAVAL
EXPERTS-CONSEILS | GÉNIE MARITIME

DATE D'IMPRESSION / PLOT DATE : 23 juil. 2020



SECTION 3-AA

EXISTING DERRICK 5T HEAD BLOCK BRACKET
SCALE 1:10



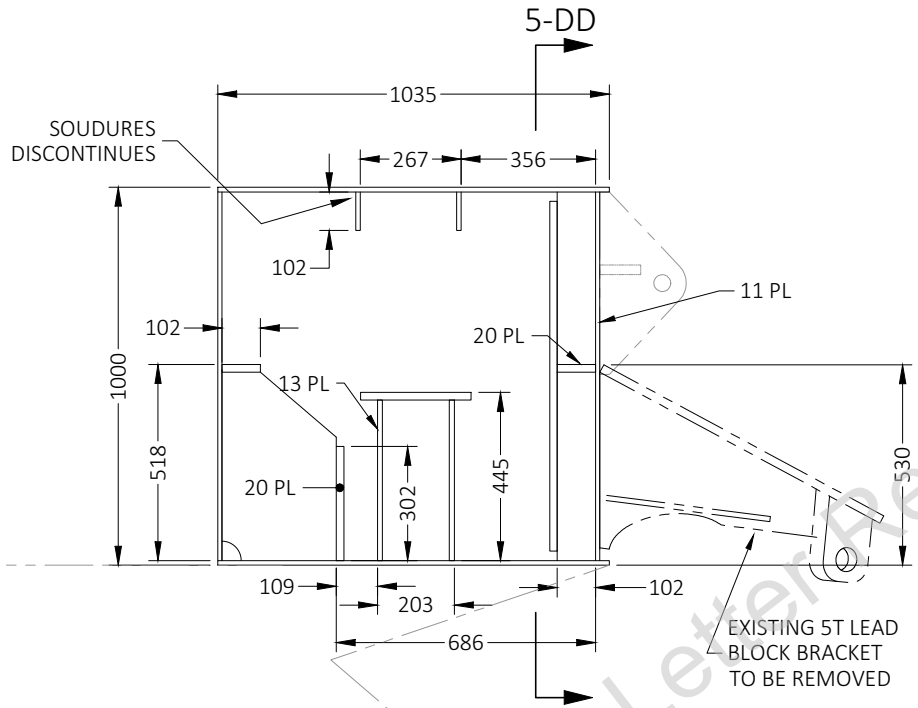
DETAIL 3-BB

HOIST BRACKET
ELEVATION
SCALE 1:10

CLIENT/CLIENT: CANADIAN COAST GUARD	NO. DESSIN/DWG. NB: C20-14-601-01	REV. 1	DESSINÉ/DRAWN: T.C. / H.R.	FEUIL./SHT 3 / 7	
PROJET/PROJECT: MARTHA L. BLACK DERRICK	PRELIMINARY				
TITRE/TITLE: INCREASE HOIST 5T TO 8 T	PRECISE MESUREMENTS TO BE DONE ONBOARD				

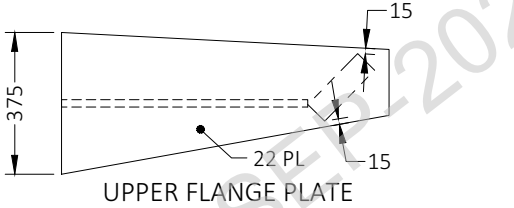
CONCEPT NAVAL
EXPERTS-CONSEILS | GÉNIE MARITIME

DATE D'IMPRESSION / PLOT DATE : 23 juil. 2020

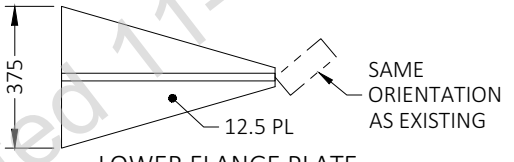


DETAIL 4-CC

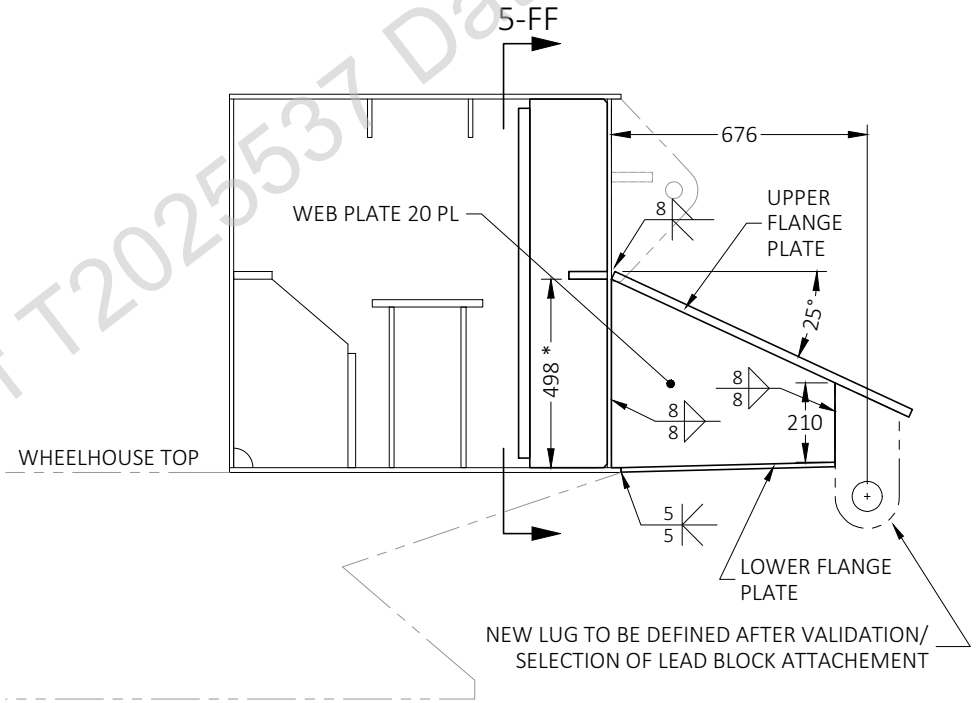
WHEELHOUSE TOP BOX
ELEVATION SECTION, EXISTING
SCALE 1:20



UPPER FLANGE PLATE



LOWER FLANGE PLATE



DETAIL 4-GG

WHEELHOUSE TOP BOX
ELEVATION SECTION, MODIFICATIONS
SCALE 1:20

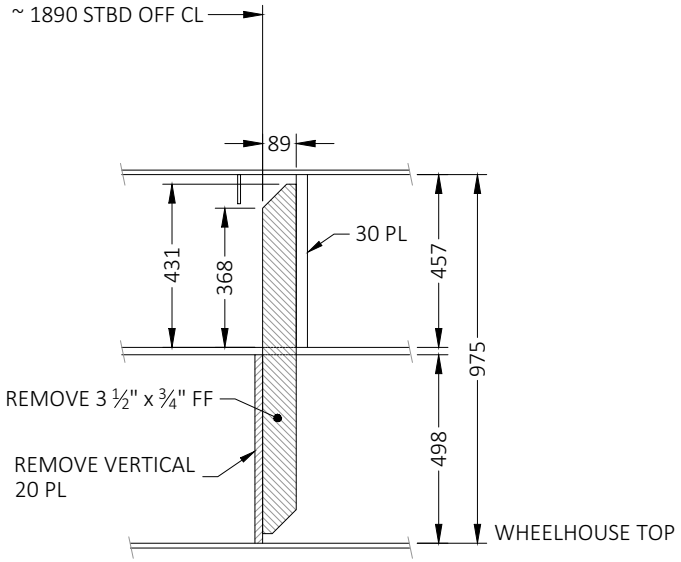
CLIENT/CLIENT: CANADIAN COAST GUARD
PROJET/PROJECT: MARTHA L. BLACK DERRICK
TITRE/TITLE: INCREASE HOIST 5T TO 8 T

NO. DESSIN/DWG. NB:	REV.	DESSINÉ/DRAWN:	FEUIL./SHT
C20-14-601-01	0	T.C. / H.R.	4 / 6

PRELIMINARY

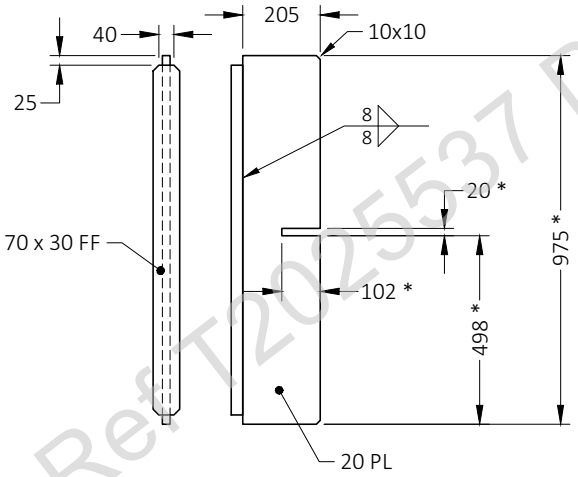
PRECISE MESUREMENTS TO BE DONE ONBOARD

CONCEPT NAVAL
EXPERTS-CONSEILS | GÉNIE MARITIME



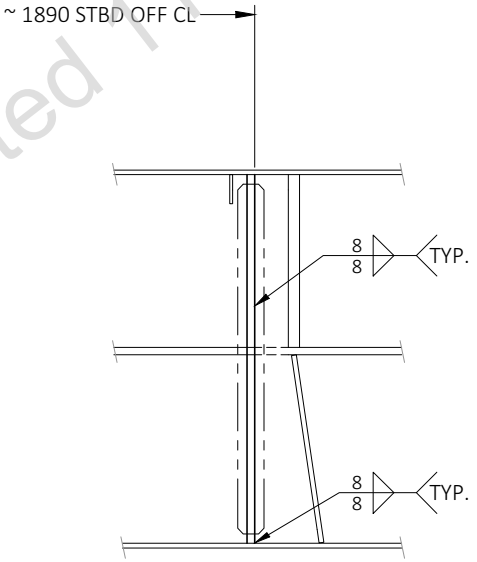
DETAIL 5-DD

INSIDE TOP BOX LOOKING FORWARD
EXISTING STRUCTURE I.W.O 5T LEAD BLOCK BRACKET
STRIP OUT



DETAIL 5-EE

INSIDE TOP BOX LOOKING FORWARD
PRE-FABRICATE NEW STIFFENER
* DIMENSIONS TO BE VALIDATED ON BOARD



DETAIL 5-FF

INSIDE TOP BOX LOOKING FORWARD
INSTALLATION OF NEW STIFFENER

NOTES

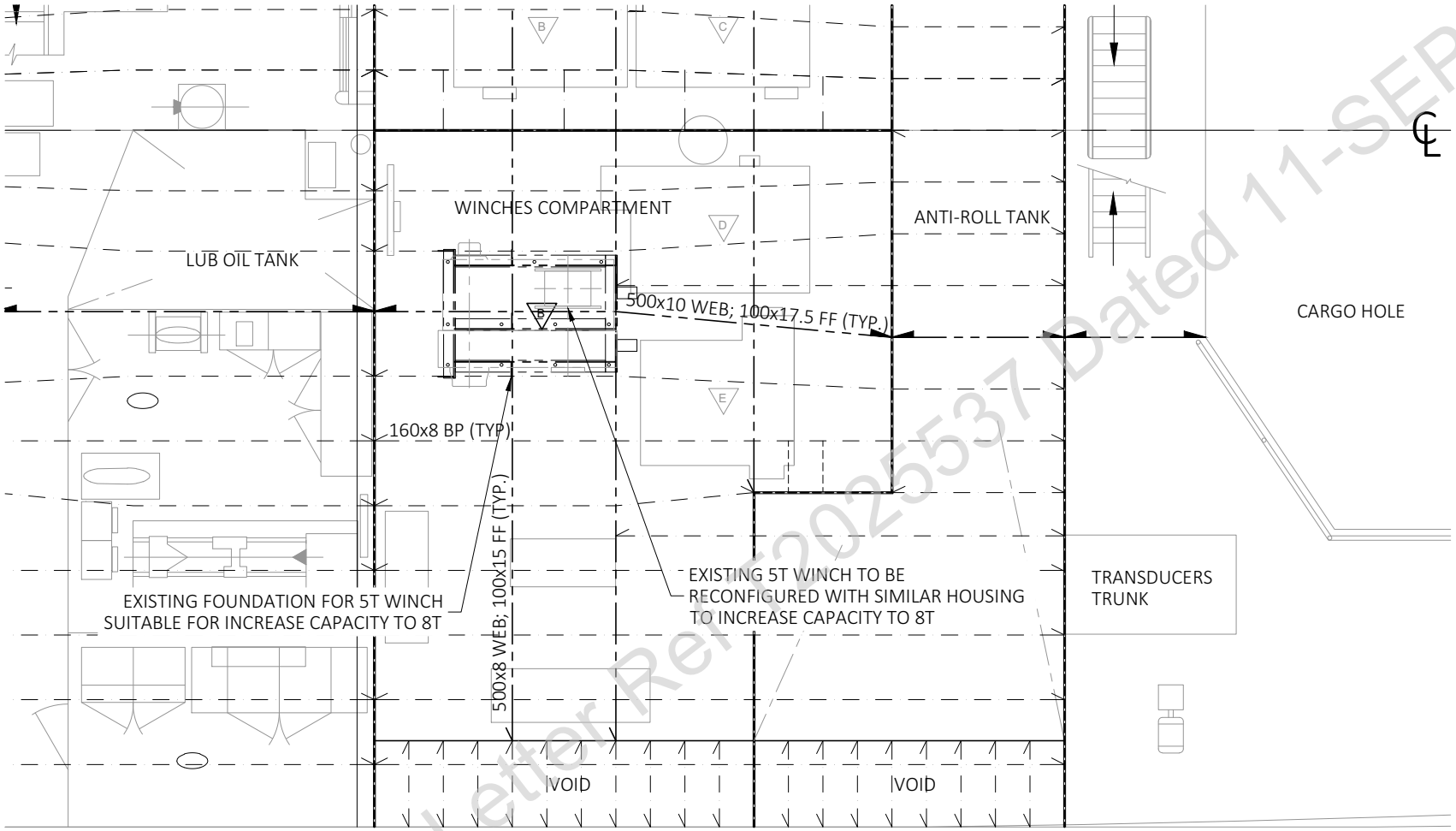
1. STEEL GRADES TO BE GRADE D OR EQUIVALENT FOR LOW TEMPERATURE APPLICATION.
2. WELDINGS AND PROCEDURES TO BE AS PER CLASS REQUIREMENTS.

CLIENT/CLIENT: CANADIAN COAST GUARD
PROJET/PROJECT: MARTHA L. BLACK DERRICK
TITRE/TITLE: INCREASE HOIST 5T TO 8 T

NO. DESSIN/DWG. NB: C20-14-601-01 | REV.: 1 | DESSINÉ/DRAWN: T.C. / H.R. | FEUIL./SHT: 5 / 7

PRELIMINARY
PRECISE MESUREMENTS TO BE DONE ONBOARD

CONCEPT NAVAL
EXPERTS-CONSEILS | GÉNIE MARITIME

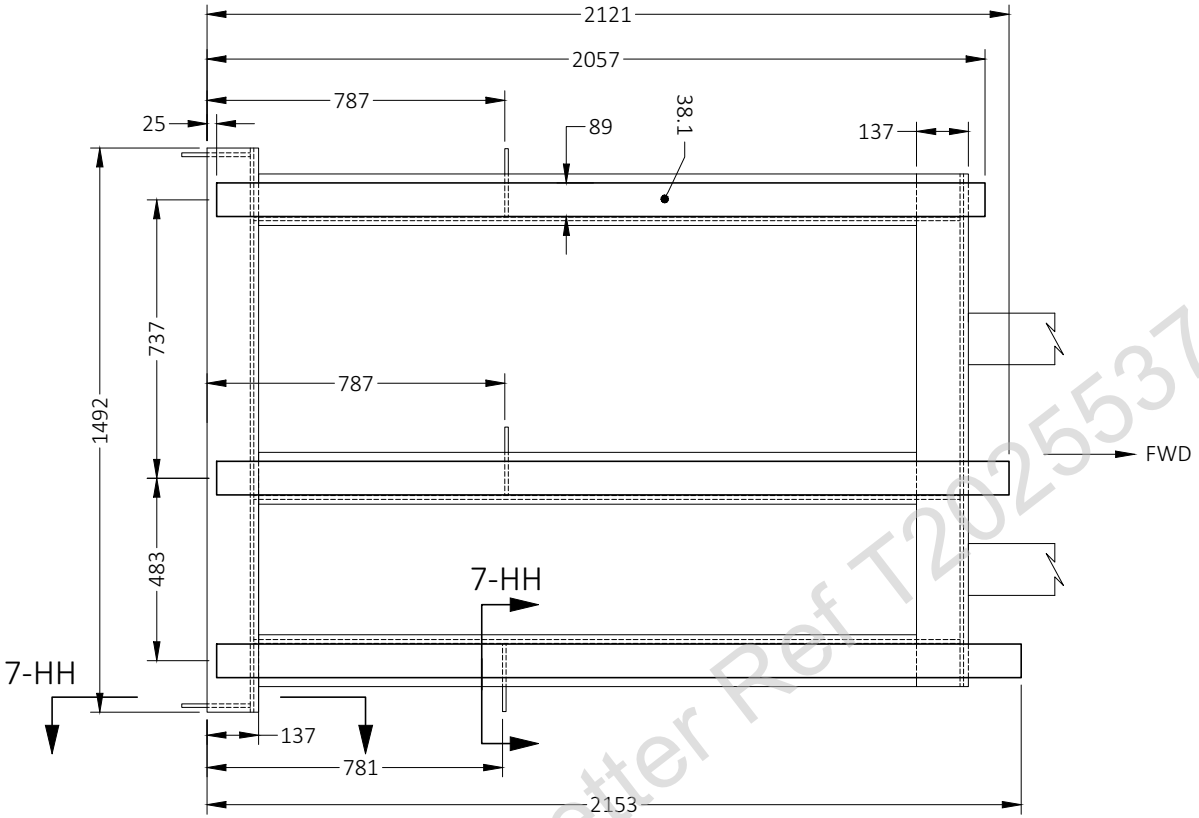


PLAN VIEW ON LOWER DECK

FOUNDATION FOR THE WINCH
SCALE 1:75

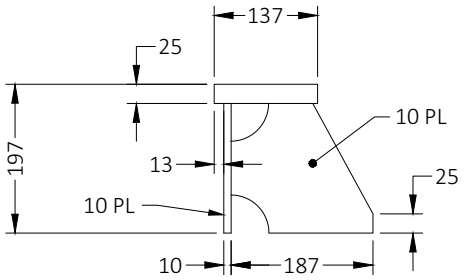
CLIENT/CLIENT: CANADIAN COAST GUARD	NO. DESSIN/DWG. NB: C20-14-601-01	REV. 1	DESSINÉ/DRAWN: T.C. / H.R.	FEUIL./SHT 6 / 7	CONCEPT NAVAL EXPERTS-CONSEILS | GÉNIE MARITIME
PROJET/PROJECT: MARTHA L. BLACK DERRICK	PRELIMINARY				
TITRE/TITLE: INCREASE HOIST 5T TO 8 T	PRECISE MESUREMENTS TO BE DONE ONBOARD				

DATE D'IMPRESSION / PLOT DATE : 23 juil. 2020



EXISTING 5T WINCH SEAT (STBD)

PLAN VIEW
SCALE 1:20



DÉTAIL 7-HH

TYPICAL PROFILE SECTION
ÉCHELLE 1:10

CLIENT/CLIENT: CANADIAN COAST GUARD	NO. DESSIN/DWG. NB: C20-14-601-01	REV. 1	DESSINÉ/DRAWN: T.C. / H.R.	FEUIL./SHT 7 / 7	
PROJET/PROJECT: MARTHA L. BLACK DERRICK	PRELIMINARY				
TITRE/TITLE: INCREASE HOIST 5T TO 8 T	PRECISE MESUREMENTS TO BE DONE ONBOARD				

CONCEPT NAVAL
EXPERTS-CONSEILS | GÉNIE MARITIME

CONCEPT NAVAL
EXPERTS-CONSEILS | GÉNIE MARITIME

25, RUE DU MARCHÉ-CHAMPLAIN, #101, QUÉBEC, QC G1K 4H2
@: INFO@CONCEPTNAVAL.COM T.: 418.692.1524 F.: 418.692.1527 W.: CONCEPTNAVAL.COM