

AC ELECTRICAL LOAD ANALYSIS

For a

48 FT STEEL TOWBOAT

For

**Tennessee Department of Transportation
Houston - Benton County Ferry**

Prepared by

SEACRAFT DESIGN, LLC

File Ref. 20029

Document 301-T11

Revision A

25 Aug 2022

NOTES:

1. This Load Analysis investigates both the "Normal Sea" condition and an "Emergency Response" condition, following the guidance provided by USCG Navigation and Vessel Inspection Circular No. 2-89 (NVIC 2-89), Appendix 2. In this context, the "Emergency Response" condition contemplates the vessel in a situation responding to hypothetical emergency, applying 1.0 load factor to such items as might be employed in countering the emergency, and minimizing non-critical loads. This "Emergency" load analysis does not relate in any way to requirements found in rule or regulation (as may or may not apply) for emergency source of power, or such emergency loads as may be associated with an emergency source of power.

LTR	Revisions	Date
A	Change voltage & load of crew area air cond. (panel 1, ckt 5)	8/25/22

AC ELECTRICAL LOAD ANALYSIS

48-ft Towboat for TDOT

25 Aug 2022

page 1

PANEL: MAIN SWITCHBOARD, 120/240V, 1 PHASE SINGLE BUS

Revision A

Load Description	Connected Load					Connected, per Leg				Normal Sea		Emergency		Shore Power	
	Amps / PF or Watts	Volts	Phase	eKW	Conn.	A	B	C	L/F	eKW	L/F	eKW	L/F	eKW	
PANEL 1, ENGINE ROOM INCLUDES SUBPANELS 2 & 3				65.02		57.67	51.43	0.00		13.29		12.89		12.51	
STEERING HPU MOTOR	23.0	1.0	240	5.52	AB	5.52	5.52	0.00	0.3	1.66	0.3	1.66	0.0	0.00	
SWITCHBOARD TOTAL				70.54						14.95		14.55		12.51	

AC ELECTRICAL LOAD ANALYSIS

page 2

48-ft Towboat for TDOT

PANEL: PANEL 1, ENGINE ROOM

25 Aug 2022

Revision A

CKT	Load Description	Connected Load					Load per Leg				Normal Sea		Emergency		Shore Power		
		Amps / PF or Watts	Volts	Phase	eKW	Conn.	Ph A	Ph B	Ph C	L/F	eKW	L/F	eKW	L/F	eKW		
1	AIR COMPRESSOR, 2 HP	7.5	1.0		240	1	1.80	AB	1.80	1.80	0.00	0.2	0.36	0.2	0.36	0.2	0.36
2	ENGINE ROOM LIGHTING			400	120	1	0.40	A	0.40	0.00	0.00	0.9	0.36	0.9	0.36	0.9	0.36
3	W/ 1						0.00	B	0.00	0.00	0.00		0.00		0.00		0.00
4	ENGINE ROOM EXHAUST FAN	4.9	1.0		120	1	0.59	B	0.00	0.59	0.00	0.9	0.53	1.0	0.59	0.1	0.06
5	CREW AREA AIR CONDITIONER (heat on)	8.0	1.0		120	1	0.96	A	0.96	0.00	0.00	0.0	0.00	0.0	0.00	0.0	0.00
6	BILGE PUMP, 1.5 HP	8.5	1.0		240	1	2.04	AB	2.04	2.04	0.00	0.1	0.20	1.0	2.04	0.1	0.20
7							0.00	B	0.00	0.00	0.00		0.00		0.00		0.00
8	W/ 6						0.00	B	0.00	0.00	0.00		0.00		0.00		0.00
9	CREW AREA LIGHTING			160	120	1	0.16	A	0.16	0.00	0.00	0.9	0.14	0.9	0.14	0.9	0.14
10	RECEPTACLES IN ENGINE ROOM			1000	120	1	1.00	A	1.00	0.00	0.00	0.1	0.10	0.0	0.00	0.1	0.10
11	REFRIGERATOR			600	120	1	0.60	B	0.00	0.60	0.00	0.4	0.24	0.4	0.24	0.4	0.24
12	ENGINE RM 240V RECEPTACLE	60.0	1.0		240	1	14.40	AB	14.40	14.40	0.00	0.0	0.00	0.0	0.00	0.0	0.00
13	BARGE RAMP WINCH "A"	8.0	1.0		240	1	1.92	AB	1.92	1.92	0.00	0.2	0.38	0.0	0.00	0.0	0.00
14	W/ 12						0.00	A	0.00	0.00	0.00		0.00		0.00		0.00
15	W/13						0.00	B	0.00	0.00	0.00		0.00		0.00		0.00
16	FIRE PUMP, 5 HP	21.5	1.0		240	1	5.16	AB	5.16	5.16	0.00	0.1	0.52	1.0	5.16	0.0	0.00
17	BARGE RAMP WINCH "B"	8.0	1.0		240	1	1.92	AB	1.92	1.92	0.00	0.2	0.38	0.0	0.00	0.0	0.00
18	W/ 16						0.00	A	0.00	0.00	0.00		0.00		0.00		0.00
19	W/ 17						0.00	B	0.00	0.00	0.00		0.00		0.00		0.00
20	FUEL OIL TRANSFER PUMP	25.6	1.0		120	1	3.07	B	0.00	3.07	0.00	0.1	0.31	0.0	0.00	0.1	0.31
21	LIGHTS & RECEPTACLES IN HEAD			400	120	1	0.40	A	0.40	0.00	0.00	0.4	0.16	0.4	0.16	0.4	0.16
22	MICROWAVE			1100	120	1	1.10	A	1.10	0.00	0.00	0.4	0.44	0.0	0.00	0.1	0.11
23	RECEPTACLES IN CREW AREA			1000	120	1	1.00	B	0.00	1.00	0.00	0.2	0.20	0.0	0.00	0.2	0.20
24	NON-POTABLE WATER PUMP, 0.50 HP	8.6	1.0		120	1	1.03	B	0.00	1.03	0.00	0.2	0.21	0.2	0.21	0.1	0.10
25	CREW AREA HEATER			4000	240	1	4.00	AB	4.00	4.00	0.00	0.7	2.80	0.0	0.00	0.7	2.80
26	SUB-PANEL 2						12.59	AB	11.53	5.06	0.00	0.00	4.58	0.00	3.64	0.00	3.66
27	W/ 25						0.00	B	0.00	0.00	0.00		0.00		0.00		0.00
28	W/ 26						0.00	B	0.00	0.00	0.00		0.00		0.00		0.00
29	ENGINE ROOM HEATER			5000	240	1	5.00	AB	5.00	5.00	0.00	0.2	1.00	0.0	0.00	0.7	3.50
30	STERN WINCH, PORT	8.0	1.0		240	1	1.92	AB	1.92	1.92	0.00	0.1	0.19	0.0	0.00	0.0	0.00
31	W/ 29						0.00	B	0.00	0.00	0.00		0.00		0.00		0.00
32	W/ 30						0.00	B	0.00	0.00	0.00		0.00		0.00		0.00
33	STERN WINCH, STBD	8.0	1.0		240	1	1.92	AB	1.92	1.92	0.00	0.1	0.19	0.0	0.00	0.0	0.00
34	SEWAGE PUMP, 1.5 HP	17.0	1.0		120	1	2.04	A	2.04	0.00	0.00	0.0	0.00	0.0	0.00	0.1	0.20
35	W/ 33						0.00	B	0.00	0.00	0.00		0.00		0.00		0.00
36							0.00	B	0.00	0.00	0.00		0.00		0.00		0.00
37							0.00	A	0.00	0.00	0.00		0.00		0.00		0.00
38							0.00	A	0.00	0.00	0.00		0.00		0.00		0.00
39							0.00	B	0.00	0.00	0.00		0.00		0.00		0.00
40							0.00	B	0.00	0.00	0.00		0.00		0.00		0.00
41							0.00	A	0.00	0.00	0.00		0.00		0.00		0.00
42							0.00	A	0.00	0.00	0.00		0.00		0.00		0.00
	TOTALS						65.02		57.67	51.43	0.00		13.29		12.89		12.51

AC ELECTRICAL LOAD ANALYSIS

page 3

48-ft Towboat for TDOT

PANEL: SUB-PANEL 2, PILOTHOUSE

25 Aug 2022

Revision A

CKT	Load Description	Connected Load				Load per Leg				Normal Sea		Emergency		Shore Power			
		Amps / PF or Watts	Volts	Phase	eKW	Conn.	Ph A	Ph B	Ph C	L/F	eKW	L/F	eKW	L/F	eKW		
1	PH AIR CONDITIONER (heat on)	15.3	1.0	120	1	1.84	A	1.84	0.00	0.00	0.0	0.00	0.0	0.00	0.0	0.00	
2	SUB-PANEL 3 IN PILOTHOUSE					4.68	A	4.68	0.00	0.00		1.43		3.41		0.51	
3	FIRE ALARM PANEL	0.5	1.0	120	1	0.06	B	0.00	0.06	0.00	1.0	0.06	1.0	0.06	1.0	0.06	
4	W/ 2					0.00	B	0.00	0.00	0.00		0.00		0.00		0.00	
5	PILOTHOUSE VOID LIGHTS			200	120	1	0.20	A	0.20	0.00	0.00	0.1	0.02	0.0	0.00	0.1	0.02
6	PILOTHOUSE HEATER			4000	240	1	4.00	AB	4.00	4.00	0.00	0.7	2.80	0.0	0.00	0.7	2.80
7	PILOTHOUSE RECEPTACLES			1000	120	1	1.00	B	0.00	1.00	0.00	0.1	0.10	0.0	0.00	0.1	0.10
8	W/ 6					0.00	B	0.00	0.00	0.00		0.00		0.00		0.00	
9						0.00	A	0.00	0.00	0.00		0.00		0.00		0.00	
10	BATTERY CHARGER	6.8	1.0	120	1	0.82	A	0.82	0.00	0.00	0.2	0.16	0.2	0.16	0.2	0.16	
11						0.00	B	0.00	0.00	0.00		0.00		0.00		0.00	
12						0.00	B	0.00	0.00	0.00		0.00		0.00		0.00	
13						0.00	A	0.00	0.00	0.00		0.00		0.00		0.00	
14						0.00	A	0.00	0.00	0.00		0.00		0.00		0.00	
15						0.00	B	0.00	0.00	0.00		0.00		0.00		0.00	
16						0.00	B	0.00	0.00	0.00		0.00		0.00		0.00	
17						0.00	A	0.00	0.00	0.00		0.00		0.00		0.00	
18						0.00	A	0.00	0.00	0.00		0.00		0.00		0.00	
TOTALS						12.59		11.53	5.06	0.00		4.58		3.64		3.66	

AC ELECTRICAL LOAD ANALYSIS

page 4

48-ft Towboat for TDOT

PANEL: SUB-PANEL 3, PILOTHOUSE

25 Aug 2022

Revision A

CKT	Load Description	Connected Load				Load per Leg				Normal Sea		Emergency		Shore Power		
		Amps / PF	Watts	Volts	Phase	eKW	Conn.	Ph A	Ph B	Ph C	L/F	eKW	L/F	eKW	L/F	eKW
1	SEARCHLIGHT, PORT		1000	120	1	1.00	A	1.00	0.00	0.00	0.1	0.10	1.0	1.00	0.0	0.00
2	SEARCHLIGHT, STBD		1000	120	1	1.00	A	1.00	0.00	0.00	0.1	0.10	0.0	0.00	0.0	0.00
3	FLOOD LIGHTS, FWD		1000	120	1	1.00	A	1.00	0.00	0.00	0.4	0.40	0.9	0.90	0.1	0.10
4	FLOOD LIGHTS, AFT		1000	120	1	1.00	A	1.00	0.00	0.00	0.4	0.40	0.9	0.90	0.1	0.10
5	EXTERIOR DECK LIGHTS		600	120	1	0.60	B	0.00	0.60	0.00	0.6	0.36	0.9	0.54	0.4	0.24
6	PILOTHOUSE INTERIOR LIGHTS		80	120	1	0.08	B	0.00	0.08	0.00	0.9	0.07	0.9	0.07	0.9	0.07
7						0.00	B	0.00	0.00	0.00		0.00		0.00		0.00
8						0.00	B	0.00	0.00	0.00		0.00		0.00		0.00
TOTALS						4.68		4.00	0.68	0.00		1.43		3.41		0.51