Maximum Capability Document
for
TSE SD-70 "SIO"
S/N 03-2940-01

Revision 10/03/2016

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By

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This document has been prepared to satisfy the requirements set forth in Appendix B of the UNOLS Research Vessel Safety Standard (RVSS) 10th Edition.

References

1. *MODEL: SD-70 WINCH,* TSE International, Inc., 3 April 2010.

2. University-National Oceanographic Laboratory System (UNOLS), *UNOLS Research Vessel Safety Standards (RVSS)*, Appendix A: "UNOLS Rope and Cable Safe Working Standards," 10th edition, July 2015.

3. University-National Oceanographic Laboratory System (UNOLS), *UNOLS Research Vessel Safety Standards (RVSS)*, Appendix B: "UNOLS Overboard Handling Systems Design Standards and Criteria for the Design and Operation of Overboard Handling Systems," 10th edition, July 2015.

Abbreviations

MCD	Maximum Capability Document
NBL	Nominal Breaking Load
RVSS	Research Vessel Safety Standards
SWT	Safe Working Tension
UNOLS	University-National Oceanographic Laboratory System

Purpose

This document formally sets the Safe Working Tension (SWT) for the TSE SD-70 "SIO" and its attached bolting plates; it provides all other information required by section B.5 of UNOLS RVSS Appendix B, 10th edition as well.

Allowable Deployment Types

The TSE SD-70 is a cargo-handling device designed to wind and unwind moorings. It is not an oceanographic winch. It may not be used to conduct towing or station keeping deployments.

Maximum Capabilities

The SWT below applies when the line is within the limits shown in figure 1.

SWT	7,500 lbf
Maximum Line Pull	7,500 lbf @ ø24” (core)
	3,750 lbf @ ø48” (full drum)

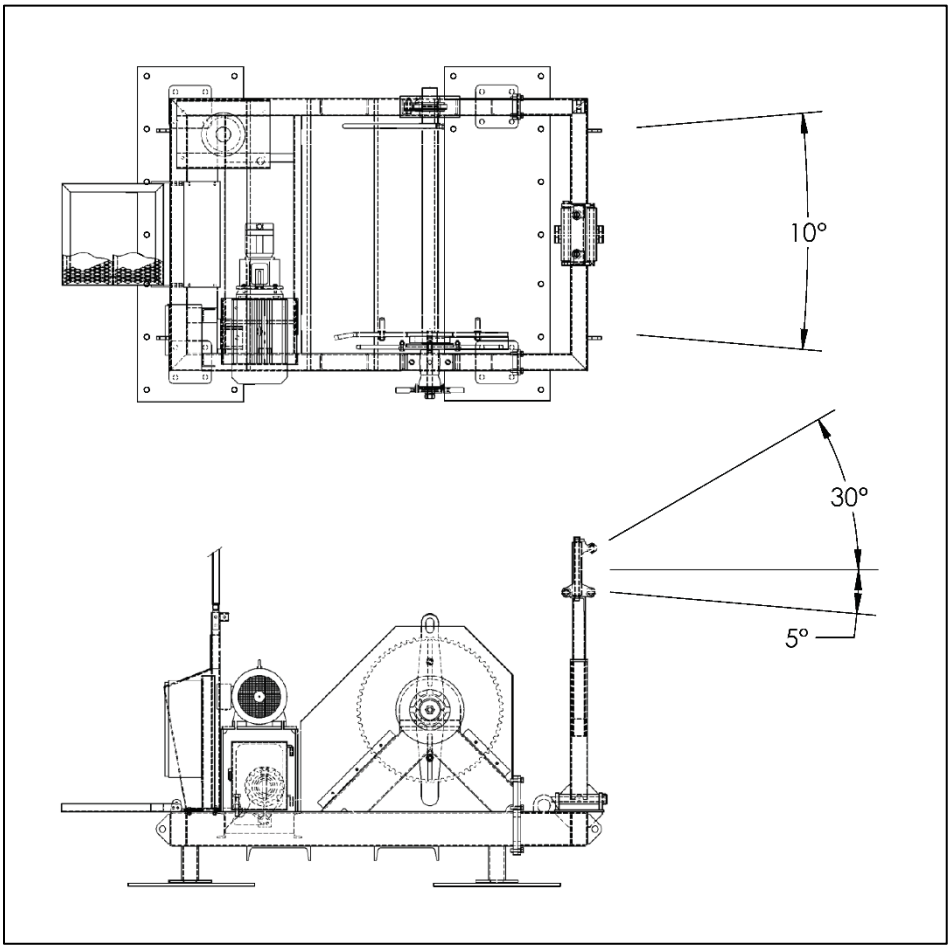

Figure 1: Applicable line geometry. Allowable fleet angle (θ) is +/- 5°. Allowable range of elevation (β) is -5° to +30°. Chain and removable drum not shown.

Reaction Forces and Bolting Requirements

TSE SD-70 "SIO" features two bolting plates for fixing it to a vessel's deck. They're illustrated in figures 2 and 3. Each plate has 14 clearance holes for ø1"-8 UNC deck bolts, but not every hole must be fitted with one. The large number of clearance holes is intended to provide the installer with numerous bolting options.

Three or four ø1"-8 UNC deck bolts are typically placed in each bolting plate. One acceptable four-bolt/plate arrangement is shown in figure 2. If this arrangement is used, the bolts must have a yield strength of 6,100 psi or more[1]. Table 2 lists worst-case forces on each deck socket for this arrangement[2].

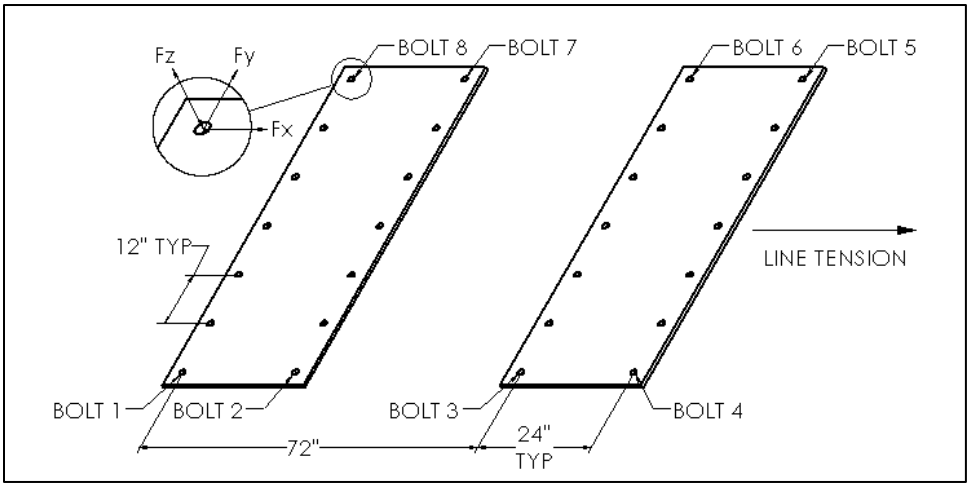

Figure 2: An acceptable four-bolt/plate bolting arrangement.

Table 2			
Bolt Number	Fx (lbf)	Fy (lbf)	Fz (lbf)
1	1180	-271	1037
2	1180	-95	154
3	1180	256	-1612
4	1180	431	-2494
5	653	431	-2685
6	653	256	-1802
7	653	-95	846
8	653	-271	-709

[1] For the sake of comparison, a typical AISI 316 stainless steel deck bolt will have a yield strength of 45,000 psi; general-purpose steel bolts, such as SAE Grade 2, have a yield strength of ~60,000 psi.

[2] Forces in tables 2 and 3 assume an empty drum, which is the worst-case from the point of view of the deck bolts and sockets, but may not be the worst-case for the deck as a whole.

An acceptable three-bolt/plate arrangement is shown in figure 3. If this arrangement is used, the bolts must have a yield strength of 7,000 psi or more. Table 3 lists worst-case forces on each deck socket for this arrangement.

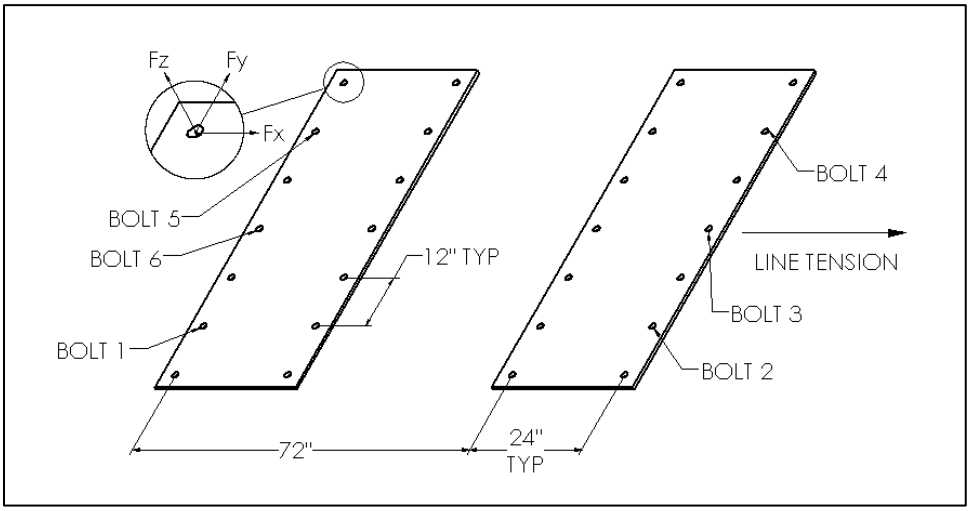

Figure 3: An acceptable 3-bolt/plate bolting arrangement.

Table 2			
Bolt Number	Fx (lbf)	Fy (lbf)	Fz (lbf)
1	1467	-424	1046
2	1467	634	-946
3	1203	634	-1706
4	938	634	-2465
5	938	-424	-473
6	1203	-424	286