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Maximum Capability Document (using UNOLS RVSS Criteria) for Markey DESH-5 Oceanographic Research Winch

Related to:

Markey Job No.: 21691 (retrofit of S/N 16356)

Vessel: R/V Atlantis

Outline Drawing No.: D43672 Rev. C

Engineer: Ross E. Murray, P.E.

Date: March 28, 2013

Type of Load	Value	Notes
Maximum Permissible Line Tension (MPT)	12,000 lbs	Maximum line pull at base layer of drum.
Design Line Tension (DLT)	12,000 lbs	Maximum line pull at base layer of drum.
Ultimate Design Line Load (UDL)	$1.5 \times 12,000 = 18,000$ lbs	Per 46CRF 189.35

Allowed Load Geometry

MPT is applicable to all line lead geometries shown on Markey drawing D43672 Rev. C

Winch Bolt and Deck Loading (refer to drawing D43672 Rev. C)

The winch foundation or vessel deck structure must be able to handle 4,000 lbs download or 4,000 lbs upload in combination with 4,000 lbs of shear at each bolt hole. This does *not* mean that the support structure has to be able to handle a total of $26 \times 4,000 = 104,000$ lbs of download or upload combined with 104,000 lbs of shear. Because of geometry and stiffness, some bolts will see more load than others.

The maximum total download will not exceed the weight of the winch (20,000 lbs) with full drum (4,000 lbs) plus the maximum downward component of the line pull (4,100 lbs), approximately 28,100 lbs total. Since MPT is 12,000 lbs, and minimum winch weight is 20,000 lbs there will never be total upload on the winch. Some bolts may see upload as the result of an overturning moment. Maximum shear is a product of the MPT plus loading from ship motion. At a 45° angle, the winch will apply a shear force of 71% of its weight to the vessel deck. Combining the shear forces gives a maximum of approximately 29,000 lbs.