DxSH-5 Winch Upgrade Project

Doug Russell
University of Washington

Project Outline

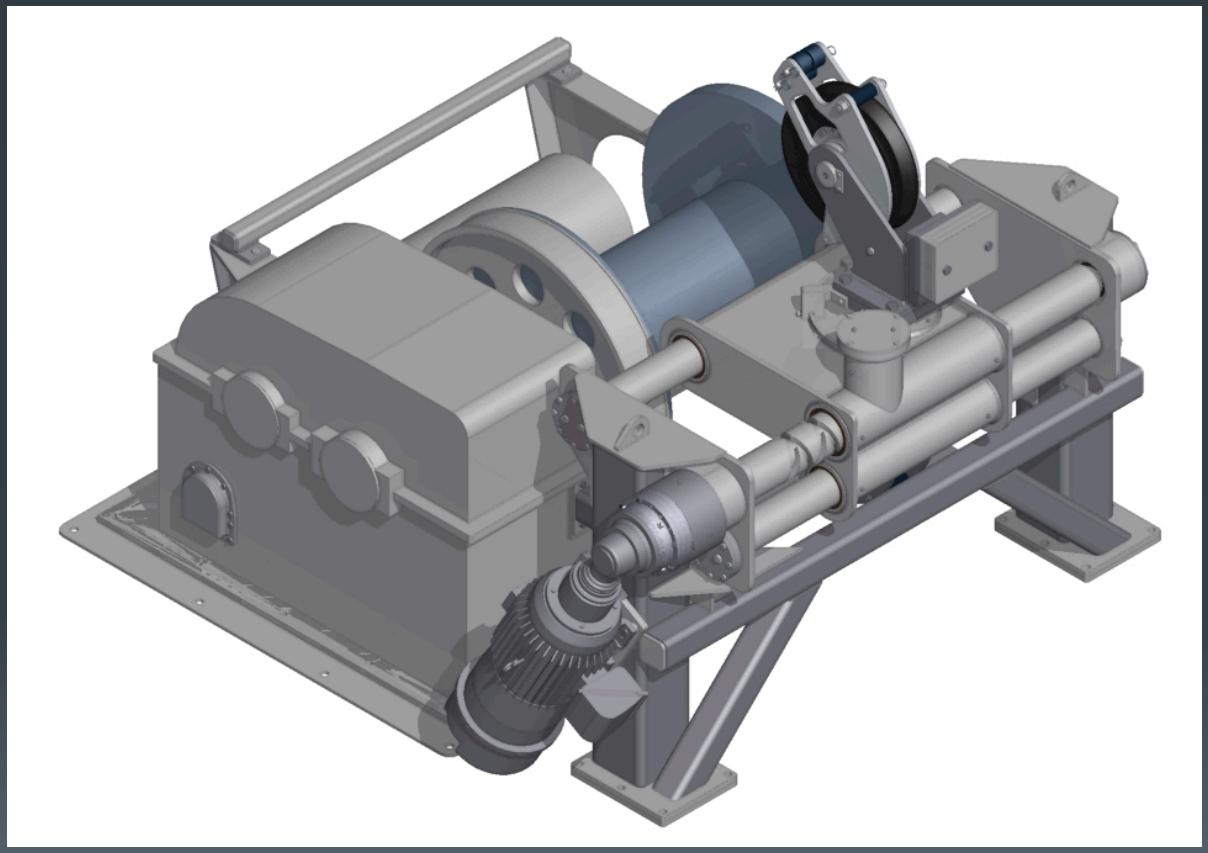
- Upgrade UNOLS fleet DxSH-5 Winches to eliminate back bending of wires
- Upgrade controls to provide Heave Compensation plus Render/Recover capabilities
- Refurbish existing DxSH-5 Winches

Upgraded DxSH-5 Winches

- Old level wind system removed
- Add an electrically driven “separate” level wind system on the “back side” of the winch
- Add a flagging block to the top of the level wind
- Remove band brake
- Lock in single speed
- Eliminate the clutch
- Upgraded coupling
- Upgraded brake
- New winch SCR drive for both the winch & the level wind
- Add Heave Comp & Render / Recover capability
- Refurbish winch – bearings, seals, motor, blast / paint
- MCD Produced plus O&M Manual updated

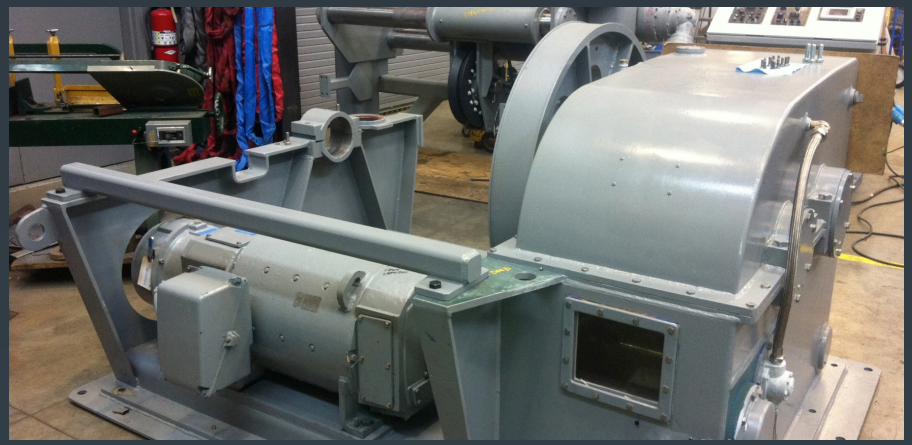
Old DESH-5

Upgraded & Refurbished DESH-5



Similar in concept to CAST-6 recently installed on R/V Roger Revelle

Atlantis Winches at Markey



Next Winches / Ships?

- Marcus Langseth – ex-Wecoma winch being worked at Markey
- Thomas G. Thompson – 2014-2015 during mid-life overhaul?
- Roger Revelle ?
- Endeavor ?
- Oceanus – OSU just had refurbished
- Atlantic Explorer – maintenance period in early 2014

Additional Info:

- Group Purchase – Separate UW POs to Markey for each project (each ship)
- Need to look ahead on maintenance / cruise schedules – time to figure 2014 plan
- Depends on available funding from NSF. UW submits SSSE request.

Questions / Issues

- Doug Russell
- dgruss@uw.edu
- 206-543-5062

MARKEY

MARKEY MACHINERY COMPANY, Inc.

7266 8th Avenue South
Seattle, WA 98108
U.S.A.

PH +1 (206) 622-4697 • FAX +1 (206) 623-9839

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 x 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 x 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.

And we have an MCD!