UNOLS
University-National Oceanographic Laboratory System

31 October 2023
UNOLS Safety Committee Determination

Issue: The UNOLS Safety Committee has been asked to consider a waiver of the Research Vessel Safety Standards (RVSS) factor of safety (FOS) requirements in Section A.8.2 and Tables A.8.2, A.8.3 and A.8.4 of Appendix A in order to conduct dredging and coring operations aboard *RV Thompson*. Specifically, the requested exemption involves the diameter requirements for side rollers on the fairlead of the installed Markey DESH 9/11 trawl winch.

Specifics and intended use: The Appendix A Factor of Safety (FS) tables require that sheaves and weight-bearing rollers have a D/d ratio of 40 : 1 (roller diameter : line diameter). When using 9/16" wire on the trawl winch, as planned in this case, the 12-inch side rollers provide a D/d ratio of only 21.3 : 1. To maintain an FS of 1.5 or greater, the side rollers would need to be at least 27.2" in diameter. Without a waiver, the depth of water and range of bottom types in dredging and coring operations would be significantly limited and would prevent the accomplishment of planned science operations. The trawl winch meets all other Appendix A requirements.

The University of Washington is engaging with the winch manufacturer to determine if larger side rollers can be fitted on the *RV Thompson's* winch. The engineering analysis and installation, if feasible, will require up to two years to accomplish. UW has therefore requested a two-year waiver.

Analysis: There appears to be no specific, directly applicable test data for the effect of side rollers on 9/16" wire rope. However, Figure 8-12 on page 8-43 of the UNOLS Handbook of Oceanographic Winch, Wire and Cable Technology (3rd Ed.) indicates that the existing D/d ratio of 21.3 corresponds to a reduction in breaking strength of 9/16" wire rope to 91% (i.e., a reduction from 32,500 lbs to 29,575 lbs). Applying an FS of 1.5 would indicate a maximum safe working tension (SWT) of 19,717 lbs.

Opinion: The opinion of the Safety Committee, based on the information provided, is that there is reasonable evidence that a waiver of RVSS Appendix A requirements can be safely granted if maximum SWT is limited to 20,000 lbs (19,717 lbs rounded upwards). As the wire will not be wrapped around the side rollers, but will have only a slight bend during operations, the reduction in wire efficiency should be minimal. The Committee agrees with UW that a weak link of 20,000 lbs should be installed to prevent tension in excess of 20,000 lbs. In addition, the Committee strongly recommends that if the SWT of 20,000 lbs is reached, the wire should be tested before the next planned cruise to ensure that the calculations and assumptions are still valid. This waiver is granted for two years to permit engineering analysis of increasing roller diameter.

D. G. Russell
UNOLS Executive Secretary

Cc: UNOLS Safety Committee
RVOC Chair