



# RVOC Safety Committee Meeting

April 2022

## **Use of Synthetic Line for over-the-side handling systems**



# Synthetic Line

- 9/16” Diameter Plasma HiCo line
- Draft Operational Guideline developed **specifically for the R/V Armstrong** Piston Coring cruise in the Puerto Rico Trench.
- Cortland’s engineering staff and manufacturer’s laboratory test results
- Knowing the Armstrong’s over-boarding configuration, (no. of sheaves, sheave diameter) and the anticipated loads an estimate of rope life was projected.
- Each load cycle contributes a small percentage of rope damage.



## What we learned from manufacturer's testing.

- Armstrong: Four 48" diameter sheaves with an anticipated piston core pull out load of 15,000 lbs.

$$\text{Life Factor} = D/d * \text{Factor of Safety}$$

With  $D/d=85$  and  $FS=2.5$  the Life Factor is 215

- 165,000 double bend cycles to failure\* ----> 40,000 operations

If FS reduced to 2.0 (18950 lbs.) 45,000 double bend cycles to failure

\* 9/16" dia Cortland Plasma HiCo line



## R/V Neil Armstrong Cruise AR64-2

- 48 coring operations (17 Piston Cores, 24 Gravity Cores, 7 Multi cores)
- Max wire out 8348 m
- Max tension 15,000 lbs. during pre-trip
- Piston core tension range: 9500 to 14,900 lbs.



## What we don't know.

- What % of rope life was expended during the Armstrong coring cruise or how much life is remaining?
- When should the rope be retired?



# How do we proceed?

- Wire Rope and Electro-mechanical cables have been limited to a few manufacturers.
  - Reasonable approach for a pool resource.
    - Simplifies the inventory requirements
    - Build experience with select products
    - Possible pricing advantages
    - Establish rapport with the manufacture(s) engineering staff
- Recommend following that proven approach with synthetic rope
  - Utilize the products of one manufacturer
    - Work with their engineering staff to develop safe operating practices

# How do we proceed (continued)

- Evaluate each proposed use:
  - Wire pool will work with the manufacturer's engineering staff to establish safe working parameters on a case by case basis.
  - Requires sufficient lead time to evaluate prospective uses and FS
  - Establish a History
    - Track double bend cycles
    - Track tensions
    - Breaking Strength history
    - Develop retirement criteria
- No Review of pending operation? Then what? Limit  $FS \geq 5$ , Minimum  $D/d=40$ , require frequent break tests

Any Questions?



