NSRP Panel Project
High-Density Ribbon Fiber Optic Cable & Tooling for Shipboard Installations

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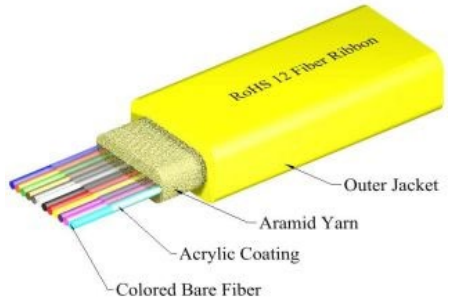
NATIONAL SHIPBUILDING RESEARCH PROGRAM™
Taking Shipbuilding and Repair to the Next Level

NSRP All Panel Meeting
Charleston, SC

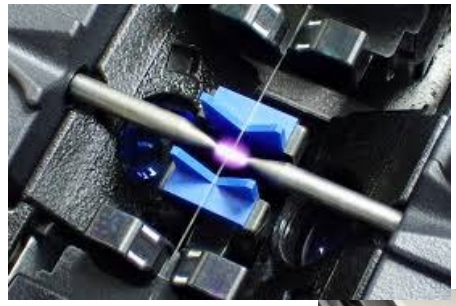
March 28-30, 2023

Background

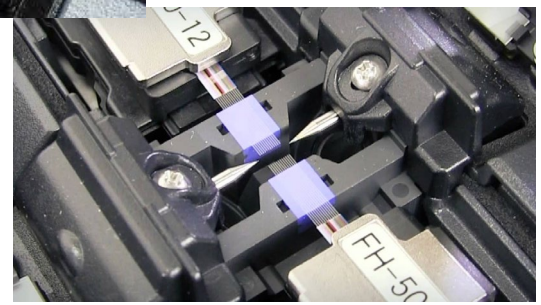
- Shipboard network infrastructure is rapidly evolving and will impact fiber optic cables on future ship programs
- Navy ship programs are planning to use high density fiber optic cable configurations to meet increasing demands of shipboard networks
  - Ribbon fiber facilitates increased signals in smaller package
- This new fiber type is expected to reduce cableway congestion and facilitate the increasing demand on shipboard data networks
- New cable configurations will require new tooling, processes, and training in order to be successfully deployed on Navy ships



TLC Ribbon Cable 12 Fiber - COTS (FIS)



Fusion Splicer Individual Fiber



Fusion Splicer Ribbon Fiber

Standard M85045 Cable Example

Project Overview

Goals & Project Objective:

- To evaluate the impact of new, high-density fiber optic cable configurations for U.S. Navy shipboard applications
- To identify process and tooling impacts of using this new technology

- Study will:
  - Identify shipyard impacts to new cable type
  - Evaluate new fiber and connector technologies
  - Conduct field studies
  - Provide feedback to Navy and manufacturers on field impacts
  - Identify new tooling required for implementation
  - Identify necessary changes and process updates to support successful transition at shipyards

Project Team

Ingalls Shipbuilding (Lead)
Newport News Shipbuilding
Penn State ARL Electro-Optics Center
KITCO Fiber Optics
Naval Surface Warfare Center Dahlgren Division

Project Technical Representative (PTR)

Walt Skalniak, Ashby Co

NSRP Project Manager

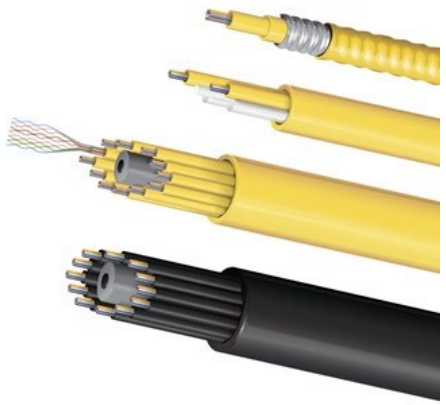
Nick Laney, ATI

Task Summary

- Task 1 - Review Requirements & Procedures
- Task 2 - Industry Survey: Ribbon Fiber & Tooling
- Task 3 - Hardware Evaluations
- Task 4 - Analysis of Shipyard Impacts
- Task 5 - Final Report & Technology Transition Plan

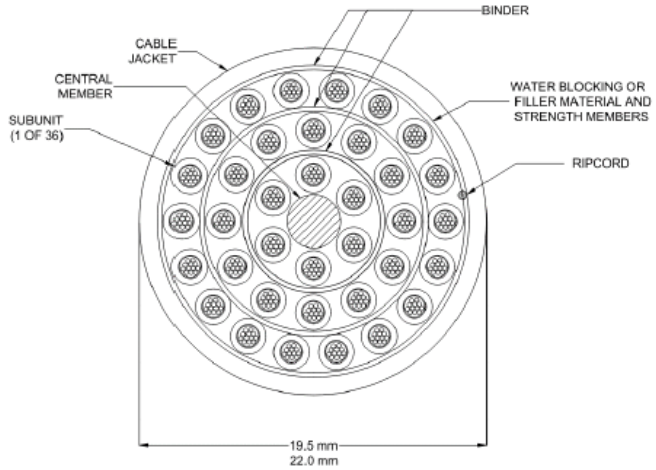
Fiber Optic Ribbon Cable

- Ribbon fiber is widely used in commercial markets
- High density configuration facilitates increased signals in smaller package
- Recent NAVSEA specifications published:
  - Cables: MIL-PRF-85045/33, /34, /35, and /37
  - Ribbon Splice: MIL-PRF-24623/8
  - Ribbon Splicer: A-A-5799



COTS Ribbon Fiber Cable Examples (Belden)

Standard M85045 Cable Example



M85045 Ribbon Cable with 36 Subunits

Next Steps

- Kick-Off Meeting
- Develop requirements
- Review current processes

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