

NSRP

National Shipbuilding Research Program

Fusion Splice Enclosure at Equipment

May 12, 2020

NSRP Electrical Technologies Panel Meeting
Teleconference



DISTRIBUTION STATEMENT A- Approved for public release.

Eliminating Fiber Optic Connectors

NSRP Panel Project 2015-442 Alternatives to Fiber Optic Connectors provided a business case for use of fusion splicing.

One more increment remains: *direct connection to furnished equipment using fusion splices in lieu of connectors.*



ROI and BENEFITS

CONNECTORS- require cleaning and inspection with every mate / demate.

FUSION SPLICES- are permanent.

IMPORTANT CONSIDERATION

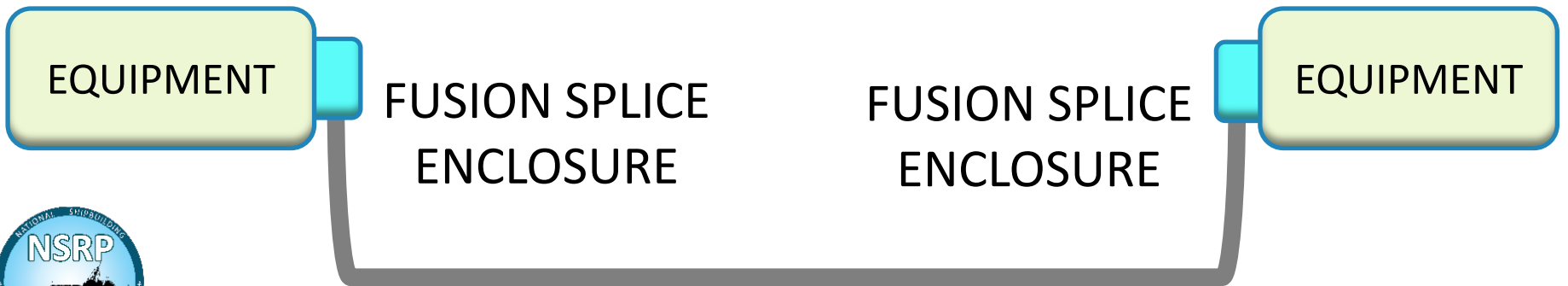
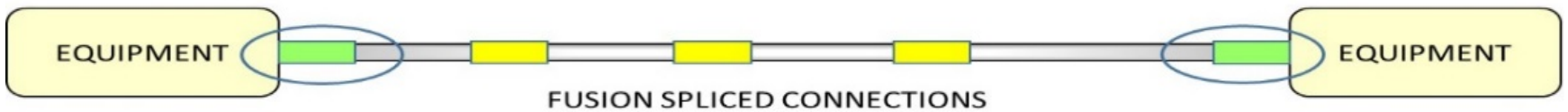
- Some connections must have connectors and the associated maintenance.

LIFE CYCLE BENEFIT- no maintenance for permanent connections!

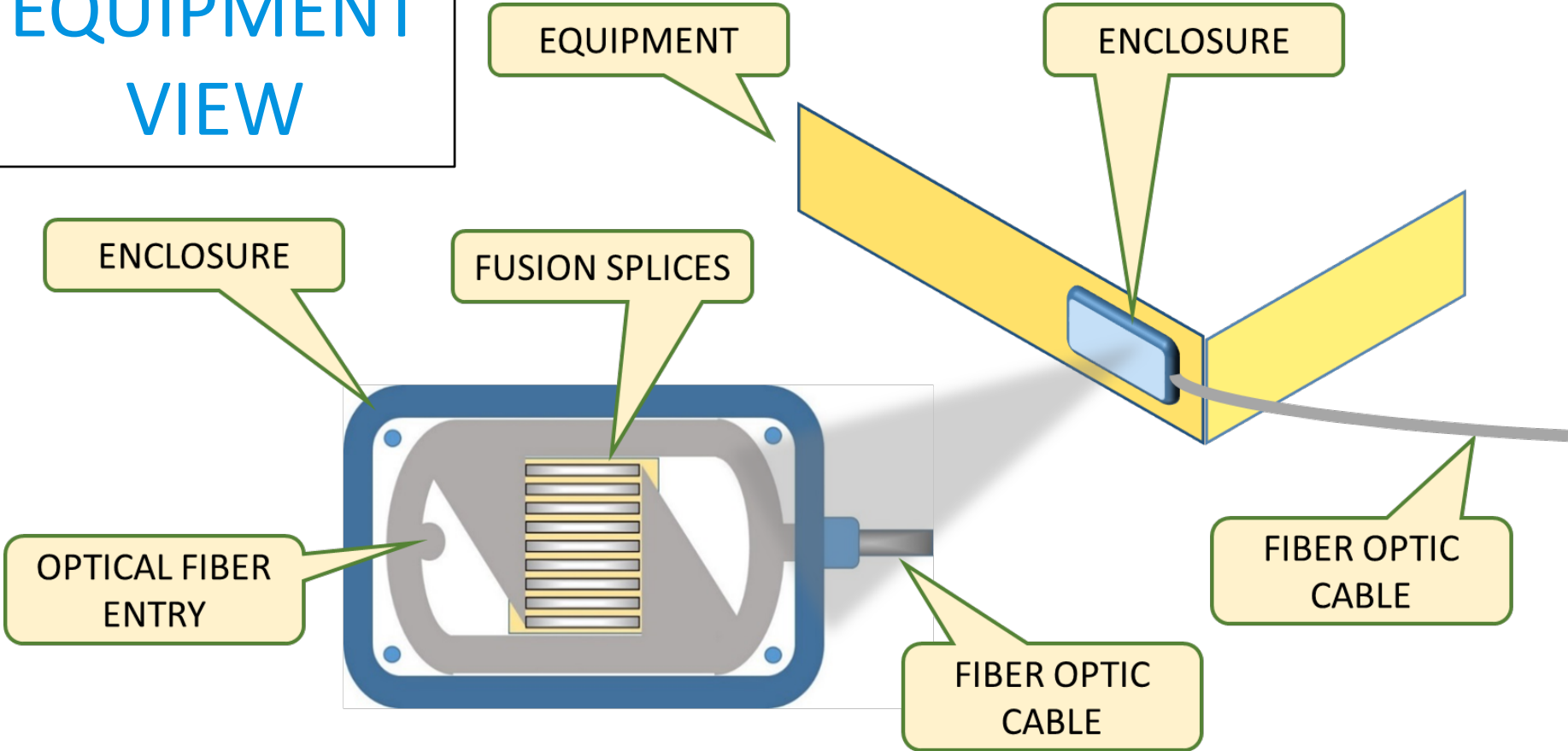
ACQUISITION*- 70 percent cost reduction in fusion spliced connection over connector. **Fusion splicer does optical performance evaluation!**

* As calculated in NSRP Panel Project 2015-442.





EQUIPMENT VIEW



(internal environment applies)

CABINET VIEW

CABINET

ENCLOSURE

FIBER OPTIC
CABLE

(external
environment
applies)



TECHNICAL DISCUSSION SO FAR:

USE CASES- equipment cabinets and consoles.

MATERIALS- will require external evaluation.

DESIGN- use M24728 as a model.

DESIGN- use best features of commercial products.

NUMBER OF FIBERS- still under discussion.

NUMBER OF FIBERS- affects enclosure volume.

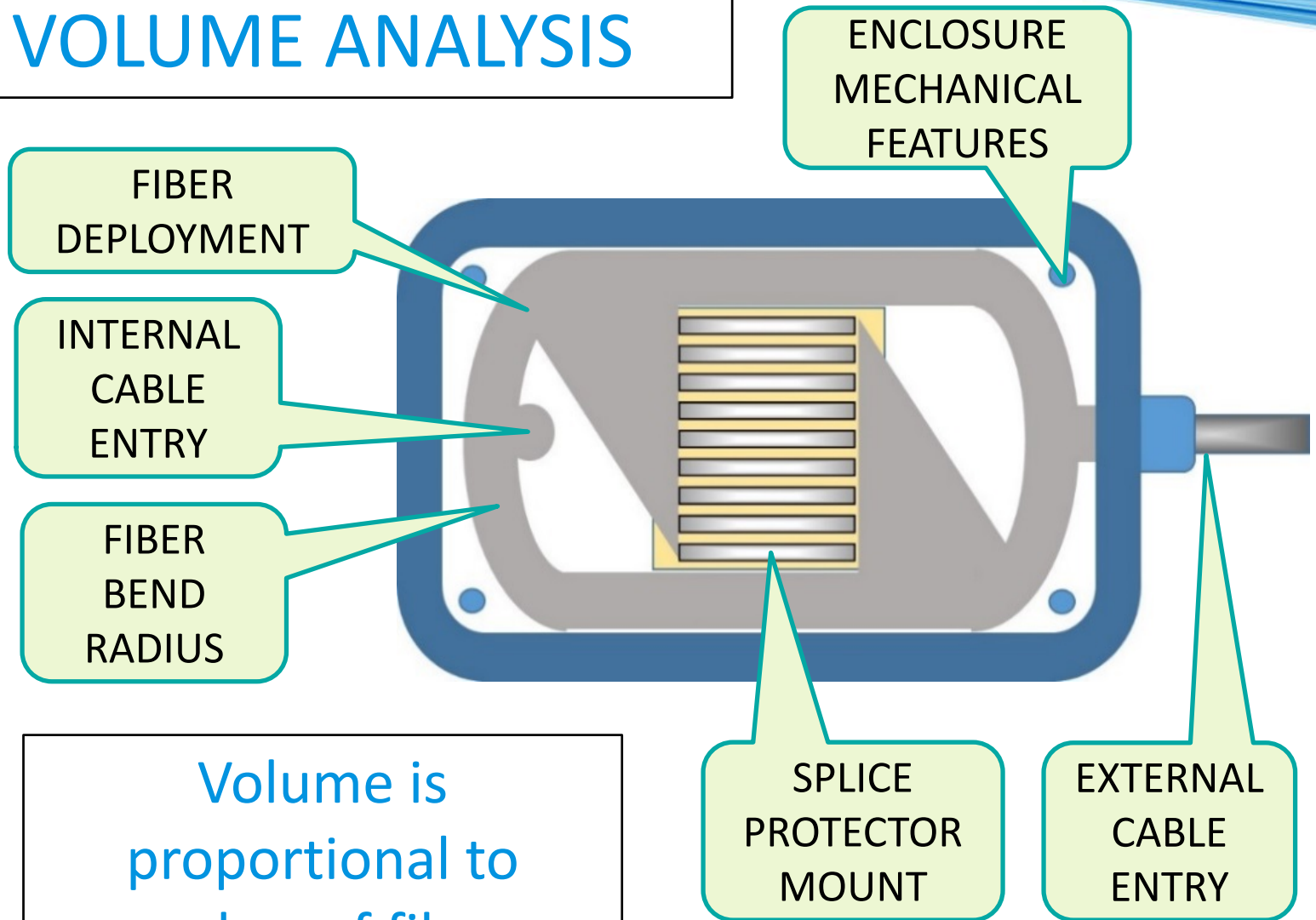
NUMBER OF FIBERS- affects enclosure volume.

NUMBER OF ENCLOSURES- multiple per cabinet?

ACQUISITION- preference is for commercial product.



VOLUME ANALYSIS



Volume is proportional to number of fibers.

Questions?

TEAM MEMBERS:

PTR [Dan Morris](#)- KITCO Fiber Optics

LEAD [John Mazurowski](#)- Penn State ARL-EOC

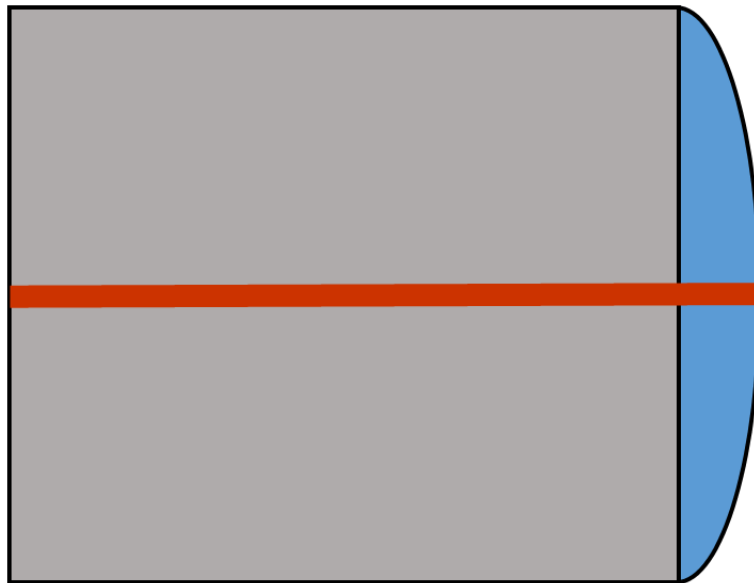
GOVT [Chris Good](#)- NSWCCD

SHIPYARD [Jason Farmer](#)- Ingalls Shipbuilding

SHIPYARD [Greg Stevens](#)- Bath Iron Works



CORE ALIGNMENT is CRITICAL



END FACE RADIUS- 10 mm

APEX OFFSET- 50 micron

FIBER HEIGHT- 50 nm

And physical measurement of glass may not correspond to where the light goes!