NAVSEA
STANDARD ITEM

FY-16

ITEM NO: 009-73
DATE: ***18 JUL 2014***
CATEGORY: I

1. SCOPE:

1.1 Title: Shipboard Electrical/Electronic/Fiber Optic Cable; remove, relocate, repair, and install

2. REFERENCES:

2.1 Standard Items

2.2 MIL-STD-2003, Electric Plant Installation Standard Methods for Surface Ships and Submarines

2.3 MIL-STD-2042, Fiber Optic Cable Topology Installation Standard Methods for Naval Ships

2.4 S9300-A6-GYD-010, Electrical Workmanship Inspection Guide for Surface Ships and Submarines

2.5 SE000-01-IMB-010, Navy Installation and Maintenance Book (NIMB), Section IX, Installation Standards (Source CD: N0002400003)

2.6 MIL-STD-1310, Shipboard Bonding, Grounding, and Other Techniques for Electromagnetic Compatibility and Safety

2.7 SE000-01-IMB-010, Navy Installation and Maintenance Book (NIMB), Section VII, Industrial Electromagnetic Compatibility (IEMC) Work Process Instructions (Source CD: N0002400003)

2.8 IA PUB-5239/31, Information Assurance Shipboard Red/Black Installation Publication

2.9 NSTISSAM TEMPEST/2-95, Red/Black Installation Guidance (FOUO)

2.10 408-8346971, Fusion Splice, Fiber Optic, MIL-PRF-24623/6, MIL-PRF-24728/8, Specific Method Pertaining to Fabrication, Installation.

3. REQUIREMENTS:

3.1 Identify, isolate and remove each cable designated for removal or replacement by the individual Work Items.

3.1.1 Remove each cable in its entirety.

3.1.1.1 Blank each bulkhead, deck penetration, and multi-cable transit device from which cable was removed and which will not be reused, in accordance with Part 3 of 2.2 and Part 3 of 2.3.

3.1.1.2 Blank each hole not required to be used in equipment from which cable was removed.

3.1.1.3 Remove unused hangers from which cable was removed and which will not be reused, and grind areas flush in way of removals.

3.1.1.4 Install new banding for cableways affected by cable removals, in accordance with Part 4 of 2.2 and Part 4 of 2.3.

3.2 Identify and isolate each cable to be pulled back, rerouted, relocated, or reused to support work required by the individual Work Items.

3.2.1 Inspect each cable end to be disconnected for correct conductor identification sleeving, including size, type, and legible lettering in accordance with referenced drawings. Ensure lugs are secured to leads and are of correct size and type, and the insulation is not damaged. Ensure optical connectors are secured to the cable, the correct type, and the cable jacket is not damaged. Accept and reject criteria for lugs and sleeving for non-fiber optic cables shall be in accordance with Chapters 3 and 4 of 2.4.

3.2.1.1 Submit one legible copy, in approved transferrable media, of a report listing results of the requirements of 3.2.1 to the SUPERVISOR.

3.2.2 Disconnect each cable. Record and retain electrical and optical hook-up data.

3.2.2.1 Accomplish the requirements of 009-22 of 2.1 for disconnected non-fiber optic cables.

3.2.2.2 Accomplish the requirements of Method ***6A1 and*** 6D1 of Part 6 of 2.3 for fiber optic cable.

3.2.3 Remove each cable from equipment and pull back to predetermined locations. Coil each cable and secure to prevent damage.

3.2.3.1 Protect disconnected connectors and wiring from the environment.

3.2.4 Install each cable to equipment or component in accordance with 2.2 and 2.5 for non-fiber optic cable, and 2.3 for fiber optic cable.

3.2.5 Band disturbed cable in accordance with Part 4 of 2.2 for non-fiber optic cable, and Part 4 of 2.3 for fiber optic cable.

3.2.6 Bond and ground non-fiber optic cable in accordance with 2.6.

3.2.7 Accomplish the requirements of 009-22 of 2.1 for non-fiber optic cables upon completion of banding and prior to reconnecting.

3.2.8 ***Accomplish the requirements of Method 6A1, 6C1 and 6K1 (for singlemode fiber links only) in accordance with Part 6 of 2.3 upon the completion of connector attachment, slack management, banding for fiber optic cables and prior to reconnection. For cables with fibers that are not terminated on both ends, accomplish Method 6D1 of Part 6 of 2.3. For concatenated links, accomplish the requirements of Methods 6E1 and 6L1 (singlemode fiber only) in accordance with Part 6 of 2.3. For Blown Optical Fiber (BOF) cables, after installation of connectors, accomplish Method 6J1 of Part 6 of 2.3. For unused BOF tubes within BOF cables, accomplish Method 6H1 and 6J1 of Part 6 of 2.3.***

3.2.8.1. Submit one legible copy, in approved transferrable media, of a report listing results of the requirements of 3.2.8 to the SUPERVISOR, using Attachments A and C for optical measurements and Attachment B for BOF cable tests. The format of Attachments A, B and C are provided as guidance. Other reporting formats can be used with approval of the SUPERVISOR.

3.2.9 Prepare each cable end and serve the lead bundles in accordance with 2.2 and 2.5 for non-fiber optic cable and 2.3 for fiber optic cable.

3.2.10 Connect each cable, using referenced drawings or retained hook-up data.

3.2.11 Install new cable identification tags in accordance with 2.2 and Part 4 of 2.3, using 2.5 for guidance.

3.3 Isolate and splice non-fiber optic cables in accordance with Part One, Appendix E of 2.2, to support work required by the individual Work Items. ***Fiber optic cables shall only be spliced in accordance with Method 1C1 of Part 1 of 2.3 or the fusion splice installation method of 2.10. NOTE: Fusion splices are only permitted within qualified and approved enclosures. Fusion splicing is not permitted in the cableway.***

3.3.1 Accomplish the requirements of 009-22 of 2.1 for each spliced non-fiber optic cable.

3.3.2 Accomplish the requirements of 3.2.5 through 3.2.11.

3.3.3 For fusion spliced links, accomplish the requirements of 6E1 and 6L1 (for singlemode fiber links only) in accordance with Part 6 of 2.3 upon the completion of fusion splicing, slack management, and banding for fiber optic cables. For cables with fibers that are not terminated on both ends, accomplish Method 6D1 of Part 6 of 2.3. For BOF cable splices, verify

continuity of each spliced tube with a ball bearing by accomplishing Method 6H1 of 2.3. For BOF cables, after installation of connectors, accomplish Method 6J1 of Part 6 of 2.3. For unused BOF tubes within BOF cables, accomplish Method 6H1 and 6J1 of Part 6 of 2.3.

3.3.3.1. Submit one legible copy, in approved transferrable media, of a report listing results of the requirements of 3.3.3 to the SUPERVISOR, using Attachment B for BOF cable tests and Attachment C for optical measurements. The format of Attachments B and C are provided as guidance. Other reporting formats can be used with approval of the SUPERVISOR.

3.4 Isolate and repair non-fiber optic cables in accordance with Part One, Appendix A through D of 2.2, and fiber optic cable in accordance with Part ***1*** of 2.3, to support work required by the individual Work Items.

3.4.1 Accomplish the requirements of 009-22 of 2.1 for each non-fiber optic cable.

3.4.2 ***Prior to repairing fiber optic cable, a***ccomplish the requirements of Method ***6A1 and*** 6D1 ***in accordance with*** Part 6 of 2.3 for each ***conventional*** fiber optic cable. ***Upon completion of the repair, accomplish the requirements of Methods 6A1, 6C1, and 6K1 (for singlemode fiber links only). For concatenated links, accomplish the requirements of Methods 6E1 and 6L1 (singlemode fiber only) in accordance with Part 6 of 2.3. For repaired cables with fibers that are not terminated on both ends, accomplish Methods 6A1 and 6D1 of Part 6 of 2.3 upon completion of the repair. For Blown Optical Fiber (BOF) cables, after installation of connectors, accomplish Method 6J1 of Part 6 of 2.3. For unused BOF tubes within BOF cables, accomplish Method 6H1 and 6J1 of Part 6 of 2.3.***

3.4.2.1. Submit one legible copy, in approved transferrable media, of a report listing results of the requirements of 3.4.2 to the SUPERVISOR, using Attachments A and C for optical measurements and Attachment B for BOF cable tests. The format of Attachments A, B and C are provided as guidance. Other reporting formats can be used with approval of the SUPERVISOR.

3.4.3 Accomplish the requirements of 3.2.5 through 3.2.11.

3.5 Install each new cable, cableway, penetration, lug, and connector in accordance with 2.2, 2.5, and 2.6 for non-fiber optic cable and 2.3 for fiber optic cable, and referenced drawings, to support work required by the individual Work Items.

3.5.1 New cable shall conform to MIL-DTL-24643 (low smoke), and MIL-DTL-24640 (lightweight) in lieu of MIL-DTL-915. New Radio Frequency (RF) cables shall conform to MIL-DTL-17 (Rev) low smoke. New fiber optic cable shall conform to MIL-PRF-85045.

3.5.1.1 Preserve the cable data package provided with new fiber optic cable. Retain the original cable data package with the unused portion of the cable.

3.5.1.2 Submit one legible copy, in approved transferrable media, of a report containing copies of the cable data packages obtained in 3.5.1.1 and cable number listings of the cables taken from each reel to the SUPERVISOR.

3.5.2 Accomplish a visual of each fiber optic cable ***(conventional and blown optical fiber (BOF))*** in accordance with Method 6A1 of 2.3.

3.5.2.1 Maintain a copy of a report listing results of the requirements of 3.5.2 for reference by the SUPERVISOR.

3.5.3 Use existing cableways and penetrations wherever possible. Penetrations shall be correct size in accordance with 2.2 and 2.3.

3.5.4 For hard-wired cables, install new conductor identification sleeving conforming to SAE-AMS-DTL-23053, Class One, white, marked with indelible ink.

3.5.4.1 Mark in accordance with the referenced drawings and/or equipment technical manual.

3.5.4.2 Install new lugs of correct size and shape conforming to MIL-T-16366 or SAE-AS7928. Do not cut off strands of copper to reduce size of lead to fit lug. Use correct barrel and hole size.

3.5.4.3 Install new fiber optic connectors of the correct size and type conforming to MIL-C-83522 or MIL-PRF-28876 ***in accordance with Part 5 of 2.3.***

3.5.5 Accomplish the requirements of 009-22 of 2.1 upon completion of lugging, connector attachment, and banding of non-fiber optic cables.

3.5.6 Accomplish the requirements of Method 6C1 ***and 6K1 (for singlemode fiber links only) in accordance with*** Part 6 of 2.3 upon the completion of connector attachment, slack management, and banding for fiber optic cables. ***For cables with fibers that are not terminated on both ends, accomplish Method 6D1 of Part 6 of 2.3. For Blown Optical Fiber (BOF) cables, after installation of connectors, accomplish Method 6J1 of Part 6 of 2.3. For unused BOF tubes within BOF cables, accomplish Method 6H1 and 6J1 of Part 6 of 2.3.***

3.5.6.1 Submit one legible copy, in approved transferrable media, of a report listing results of the requirements of 3.5.6 to the SUPERVISOR, using Attachment A ***for optical measurements and Attachment B for BOF cable tests. The format of Attachment A and B are provided as guidance. Other reporting formats can be used with approval of the SUPERVISOR.***

3.5.7 Connect leads to terminal boards and connectors to equipment using referenced drawings.

3.5.8 Accomplish post-installation Methods 6A1 and 6E1 in accordance with Part 6 of 2.3. For single mode links, accomplish Method 6L1 in accordance with Part 6 of 2.3. Post-installation Method 6A1 is performed to verify no mechanical damage exists to the installed fiber optic cables. Post-installation Methods 6E1 and 6L1 are used to measure the optical loss and return loss (respectively) over a series of concatenated optical links and is typically performed after interconnection of the Fiber Optic Cable Topology (FOCT) local and trunk cables.

3.5.8.1 Submit one legible copy, in approved transferrable media, of a report listing results of the requirements of 3.5.7 to the SUPERVISOR, using Attachment C. The format of Attachment C is provided as guidance. Other reporting formats can be used with approval of the SUPERVISOR.

3.6 Weatherproof and seal connectors exposed to the weather in accordance with 2.7.

3.7 Submit a written procedure to the SUPERVISOR for review and approval prior to the initiation of production work for the installation of multi-pin, coaxial, and fiber optic connectors, using 2.2, 2.3, and 2.5 for the minimum requirements.

3.7.1 This procedure only requires a one-time submittal/approval unless the Standard Items change and/or references change or are updated, and shall contain the following minimum information:

3.7.2 Reference the appropriate fabrication document for which the procedure is applicable.

3.7.3 Qualification requirements for the personnel performing the work.

3.7.4 Inspection and documentation forms.

3.7.5 Acceptance and rejection criteria.

3.8 Provide written designation of the Qualified Persons who will prepare electrical/fiber optic cable endings to receive connectors, assemble connector parts on the cable endings, and attach the connectors to the cable endings. Provide written designation of the Qualified Person or Persons who will supervise and inspect the execution of the process.

3.8.1 Submit one legible copy, in approved transferrable media, of any additions or modifications to the SUPERVISOR prior to the start or continuation of work.

3.8.2 Maintain current copies of the credentials of the Qualified Persons for reference by the SUPERVISOR.

3.8.2.1 Submit one legible copy, in approved transferrable media, of specific documents when requested by the SUPERVISOR.

3.9 Inspect existing cable installations affected as a result of work required by the individual Work Items and interferences within the first 25 percent of contract completion. Ensure that cable installations are in accordance with 2.2, and 2.3 for fiber optic cable.

3.9.1 Submit one legible copy, in hard copy or approved transferrable media, of a report of cable installation conditions not in compliance with 2.2 and 2.3 to the SUPERVISOR, using Attachments ***D*** and ***E***, within ***4 days*** of completion of inspections.

3.9.1.1 Report shall state if cable installation inspections resulted in no compliance issues.

3.10 Install new fasteners conforming to MIL-DTL-1222, Type One, Grade 316, stainless steel, for areas exposed to weather and high moisture areas, and Type One, Grade 2 or 5, carbon steel, zinc plated, for other areas to support work required by the individual Work Items.

3.11 Remove, install, and relocate cables which are part of the secure electrical information processing systems or are located within a secure processing space in accordance with 2.8 and 2.9 to support work required by the individual Work Items.

3.12 After installation of cables, accomplish the requirements of 009-25 of 2.1 for the local air hose test of each new and disturbed multi-cable transit device, multi-cable penetrators, stuffing tubes, kick pipes, and cable penetrations of ***all watertight, air tight, and oil tight*** boundaries.

3.13 Accomplish the requirements of 009-32 of 2.1 for new and disturbed surfaces.

4. NOTES:

4.1 A new circuit is defined as a cable not previously installed.

4.2 Pulled-back cables are those which are disconnected and physically removed from a wireway, conduit, or cableway to protect the cable from industrial work.

4.3 Reused cables are those cables disconnected from the equipment to facilitate equipment removal.

4.4 Electrical connector fabrication is the preparation of cable endings to receive multi-pin connectors, coaxial connectors, fiber optic connectors, assembly of connector parts on cables, and securing connectors to cables.

4.5 A Qualified Person is defined as a person who has successfully completed connector fabrication training and meets the qualification requirements stated below.

4.5.1 Emphasizes the importance of connector fabrication to the performance and long-term reliability of shipboard combat systems.

4.5.2 Uses 2.2 through 2.5 for basic instructional material supplemented by connector manufacturer's instructional material as desired.

4.5.3 Requires classroom lecture, study, and demonstration of each topic in Appendix A of Part 5 of 2.2, and 2.3.

4.5.4 Requires individual student practice in the use of specified tools and performance of connector fabrication techniques and procedures described in Appendices B through H of Part 5 of 2.2, Parts One through 6 of 2.3, and Paragraph 2-20.2 of 2.5.

4.5.5 Requires a minimum of 32 hours of combined classroom lecture and laboratory practice in the type of connectors to be fabricated, either electrical/electronic or fiber optic.

4.6 Connector fabrication qualifications consist of:

4.6.1 Connector Fabricator Qualification requirement: Successful completion of the training course required in 4.5.5 plus successful completion of 40 hours on-the-job training under the tutelage of a qualified connector fabricator or a qualified connector fabrication supervisor in the type of connectors to be fabricated, either electrical/electronic or fiber optic.

4.6.2 Connector Fabrication Supervisor Qualification requirement: Successful completion of the classroom training required in 4.5.5 plus be the incumbent of a supervisory electrical or electronic mechanic position.

4.6.3 Connector Fabrication Quality Assurance Inspector Qualification requirement: Successful completion of the classroom training required in 4.5.5 plus be the incumbent of a quality assurance specialist or inspector position.

4.7 Cable installations consist of cable, banding, equipment, penetrations, cableways, cable separation and connection(s), and associated hardware.

4.8 Attachment ***E*** is provided as an aid to completion of Electrical Cableway Inspection Form Attachment ***D***.

4.9 Attachment ***F*** is provided as an aid to accomplishing required documentation of electrical/electronic disconnect/reconnect reporting requirements.

ATTACHMENT A

OPTICAL MEASUREMENT RECORD (FOR ASSEMBLY LINK LOSS/RETURN LOSS)

DATE_____/_____/_____ HULL NUMBER_____
ENDPOINT LOCATIONS OR EQUIPMENT NAME: SOURCE_____ DETECTOR_____
INSTALLATION/CONFIGURATION DRAWING_____ CABLE SERIAL NUMBER_____ CABLE TYPE[1]_____
CABLE VISUAL INSPECTION RESULT (INSTALLATION) _____
CONNECTOR TYPE(S)[1]_____ TEST EQUIPMENT MANUFACTURER/MODEL NO. _____ SERIAL NO._____
CALIBRATION DUE DATE_____/_____/_____ SOURCE WAVELENGTH(S)(NM)_____ /_____ CONNECTOR ENDFACE QUALITY (3.5.4.3)_____

SOURCE CABLE NO[2]	*DETECTOR CABLE NO[2]*	*1300NM/850NM WINDOW (CIRCLE ONE)*									
FIBER COLORS[3] OR NUMBER (3.5.6)	*FIBER COLORS[3] OR NUMBER 3.5.6*	*ACCEPTABLE ASSEMBLY LINK LOSS (dB) (3.5.6:6C1)*	*ACCEPTABLE RETURN LOSS (dB) (3.5.6:6K1)*	*FORWARD REFERENCE POWER (3.5.6:6C1)*	*FORWARD MEASURED POWER (3.5.6:6C1)*	*FORWARD ASSEMBLY LINK LOSS RESULT[4] (dB) (3.5.6:6C1)*	*FORWARD RETURN LOSS RESULT[5] (dB) (3.5.6:6K1)*	*REVERSE REFERENCE POWER (3.5.6:6C1)*	*REVERSE MEASURED POWER (3.5.6:6C1)*	*REVERSE ASSEMBLY LINK LOSS RESULT (dB)[6] (3.5.6:6C1)*	*CABLE LENGTH (M) (3.5.6:6C1)*

NOTES: ***[1]RECORD MIL-SPEC NUMBER IF APPLICABLE.***
[2]FOR LINK MEASUREMENTS ONLY.
[3]STANDARD COLORS: BLUE, ORANGE, GREEN, BROWN, SLATE, WHITE, RED, BLACK, YELLOW, VIOLET, PINK, TAN.
[4]FOR SINGLEMODE AND MULTIMODE FIBER LINKS IAW 6C1 OF PART 6 OF 2.3.
[5]FOR SINGLEMODE FIBER LINKS ONLY IAW 6K1 OF PART 6 OF 2.3.
[6]FOR MULTIMODE FIBER LINKS IAW WITH 6C1 OF PART 6 OF 2.3.

CONNECTION LIST:_____ REMARKS:_____

ATTACHMENT B

BLOWN OPTICAL FIBER (BOF) TEST RECORD

DATE_____/_____/_____ HULL NUMBER_____

INSTALLATION/CONFIGURATION DRAWING_____ CABLE SERIAL NUMBER_____ CABLE TYPE[1]_____

CABLE VISUAL INSPECTION RESULT (INSTALLATION/POST-INSTALLATION) _____/_____

LOCATION 1	*EQUIPMENT 1 IDENTIFICATION*	*LOCATION 2*	*EQUIPMENT 2 IDENTIFICATION*	*BOF TRUNK CABLE IDENTIFICATION*	*BOF TRUNK TUBE NUMBER*	*BALL BEARING (BB) TEST DIRECTION[2] (3.5.6:6H1)*	*BOF TUBE BB TEST RESULT[3] (PASS/FAIL) (3.5.6:6H1)*	*BB SIZE PASS/FAIL[4] (3.5.6:6H1)*	*BOF TUBE LODGED WITH BB (Y/N) (3.5.6:6H1)*	*BOF TUBE SEAL VERIFICATION RESULTS[5] (PASS/FAIL) (3.5.6:6J1)*	*CABLE LENGTH (M)*

NOTES: ***[1]RECORD MIL-SPEC NUMBER IF APPLICABLE.***
[2]FOR EXAMPLE, TEST DIRECTION = "LOCATION 1 → LOCATION 2" OR VICE VERSA.
[3]IAW METHOD 6H1 OF PART 6 OF 2.3.
[4]FOR EXAMPLE, BB SIZE = "4.5 MILLIMETER(MM)".
[5]IAW METHOD 6J1 OF PART 6 OF 2.3.

REMARKS:_____

SIGNATURE:_____

ATTACHMENT C

OPTICAL MEASUREMENT RECORD (FOR FOCT END-TO-END ATTENUATION AND RETURN LOSS)

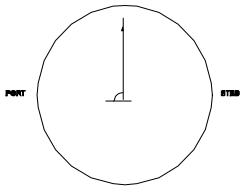
DATE_____/_____/_____ HULL NUMBER_____
ENDPOINT LOCATIONS OR EQUIPMENT NAME: SOURCE_____ DETECTOR_____
INSTALLATION/CONFIGURATION DRAWING_____ CABLE SERIAL NUMBER_____ CABLE TYPE[1]_____
CABLE VISUAL INSPECTION RESULT (POST-INSTALLATION) _____
CONNECTOR TYPE(S)[1]_____ TEST EQUIPMENT MANUFACTURER/MODEL NO. _____ SERIAL NO._____ CALIBRATION DUE DATE_____/_____/_____ SOURCE WAVELENGTH(S)(NM)_____ /_____
CONNECTOR ENDFACE QUALITY (3.5.4.3) _____

SOURCE CABLE NO.	DETECTOR CABLE NO.	1300NM/850NM WINDOW (CIRCLE ONE)							
FIBER COLORS[2] OR NUMBER (3.5.7)	FIBER COLORS[2] OR NUMBER (3.5.7)	ACCEPTABLE FOCT END-TO-END ATTENUATION (dB) (3.5.7:6E1)	ACCEPTABLE FOCT END-TO-END RETURN LOSS(dB) (3.5.7:6E1)	FORWARD REFERENCE POWER (3.5.7:6E1)	FORWARD MEASURED POWER (3.5.7:6E1)	FORWARD FOCT END-TO-END ATTENUATION RESULT (dB)[3] (3.5.7:6E1)	FORWARD FOCT END-TO-END RETURN LOSS RESULT (dB)[4] (3.5.7:6E1)	TEST DIRECTION[5] (3.5.7:6E1)	CABLE LENGTH (M)

NOTES: *[1]RECORD MIL-SPEC NUMBER IF APPLICABLE.*
[2]STANDARD COLORS: BLUE, ORANGE, GREEN, BROWN, SLATE, WHITE, RED, BLACK, YELLOW, VIOLET, PINK, TAN.
[3]IAW 6E1 OF PART 6 OF 2.3.
[4]IAW 6L1 OF PART 6 OF 2.3.
[5]FOR EXAMPLE, "SOURCE LOCATION → DETECTOR LOCATION".

*CONNECTION LIST:*_____ *REMARKS:*_____

*SIGNATURE:*_____



ELECTRICAL CABLEWAY INSPECTION FORM

DATE _____ HULL NUMBER _____

INSPECTED BY _____ INSPECTING ORGANIZATION _____

SER #	COMPT	DECK	FRAME	P/S	POS	CABLE CIRCUIT DESIG	CABLE TYPE	*CAT	*NAVSEA DWG NO.	EQUIPMENT
DESCRIPTION										
DESCRIPTION										
DESCRIPTION										
DESCRIPTION										

* SEE ATTACHMENT C FOR "CATEGORY" GUIDANCE

ATTACHMENT ***E***

INSPECTION CRITERIA FOR ELECTRICAL CABLES AND CABLEWAYS

CATEGORY 1 - Immediate Hazard
CATEGORY 2 - Potential Hazard
CATEGORY 3 - Non-Hazardous

ITEM		CRITERIA	CATEGORY
I. CABLES			
	A. Installation		
	1.	Minimum bend radius exceeded, causing visual damage to cable.	1
	2.	Minimum bend radius exceeded; No visual cable damage, cable rings out and meggers satisfactorily.	3
	3.	Equipment connector supporting weight of cable (more than 32 inches of cable from last support to end use equipment). (18 inches from shock mounted motors).	1
	4.	Cables run on or near hot objects (steam or exhaust pipes, griddles, ovens, etc.	1
	5.	Cable run outside of hangers.	3
	6.	Lack of slack at expansion joints.	2
	7.	Excess slack between hangers. (Minimum distance of 6 feet 4 inches between deck and cables.)	3
	8.	Excess cable slack stored in wireway.	3
	B. Damaged		
	1.	Bulging, bubbling or discoloration of cable jacket (evidence of overloading, overheating or hot spots.)	1
	2.	Bulging, bubbling or discolored cable jacket; but cable rings out and meggers satisfactorily.	2
	3.	Cable chafed or cut through outer jacket only.	2
	4.	Cable chafed or cut through, inner wire insulation damage.	1
	5.	Cable pulled out of equipment/junction box penetrations and leads exposed	1
	6.	Armored and unarmored cables in contact at an oblique angle causing chafing of unarmored jacket.	2

ITEM		CRITERIA	CATEGORY
	7.	Fiber cable chafed or cut beyond the cable outer jacket to the Kevlar strength members	1
C. Dead-ended			
	1.	Cable dead-ended, not end sealed and labeled (serialized) properly at both ends.	1
	2.	Cable for future use not properly sealed on both ends and labeled at both ends for the specific use.	1
	3.	Cable dead-ended, end sealed and labeled (serialized) properly.	3
D. Spliced			
	1.	Improper materials/methods used for splicing, or evidence of loose joints.	1
	2.	Splice located in bend of cable.	2
II. BANDING			
A. All Cable Runs			
	1.	Banding cuts cable outer jacket (banding too tight).	1
	2.	Banding compressing outer jacket (banding too tight but not cutting jacket).	3
	3.	Plastic tie wraps used in place of banding straps (metal banding strap required).	2
	4.	Cables secured to hanger with bailing wire or rope.	1
	5.	Bands cut and left in wireway.	2
	6.	Channel rubber not installed where required.	2
B. Horizontal Cable Runs			
	1.	Banding not installed at breakout hangers before and after penetrations or at change of direction of wireway.	2
C. Vertical Cable Runs			
	1.	No banding or loose banding (banding required on every hanger).	2
III.			
A. Cableways			
	1.	Cable hangers or hardware cutting into the cable jacket.	1

ITEM		CRITERIA	CATEGORY
	2.	Improper hanger spacing (Cable hangers are required at least every 32 inches except that hangers for multiple tier overhead aluminum decks shall be spaced every 16 inches).	2
	3.	Inadequate cableway support (hangers, hardware, tiers, or cable straps missing) or welds cracked.	2
	4.	Overload/Overcrowded cable hangers.	3
	5.	Maximum no. of tiers exceeded.	3
	6.	Inadequate fastener length.	3
	7.	One-half inch clearance between cable run and hangers above or structure not provided.	2
IV. EQUIPMENT			
	A. Covers		
	1.	Junction box or equipment covers loose or missing.	1
	B. Mounting		
	1.	Cable supporting the weight of equipment (power junction boxes, lighting fixtures switch boxes, etc.)	1
	2.	Missing loose or improperly installed mounting hardware on equipment.	2
	C. Cable Entrance		
	1.	Watertight penetrators not utilized for entrance to watertight equipment enclosures.	1
	2.	Drip loops, drip shields plastic sealer or bottom penetration not utilized for entrance to non-watertight drip proof equipment.	1
	3.	Cable can be moved in and out of tube. Improperly packed or not packed.	1
	4.	Nylon tube base loose in enclosure. (O-ring missing)	1
V. DECK/BULKHEAD PENETRATION			
	A. Non-watertight Deck or Bulkhead Cable Penetration		
	1.	No plastic sealer around cables through collars where required.	1
	2.	Chafing protection not installed at non-watertight deck or bulkhead cableway penetrations.	2

ITEM		CRITERIA	CATEGORY
	3.	Chafing ring overloaded.	3
	4.	Inadequate chafing protection and damage evidence.	1
B. Watertight Deck or Bulkhead Cable Penetration			
	1.	No plastic sealer around cable at stuffing tubes which are exposed to the weather. Note: If plastic sealer is installed at locations other than those exposed to the weather, it is not required to be removed.	2
	2.	Stuffing tube or kickpipe not utilized (cable installed without tube).	1
	3.	Unused stuffing tube or kickpipe not plugged.	1
	4.	Stuffing tube or kickpipe assembly incomplete (missing gland nut, packing, or pipe connector).	1
	5.	Stuffing tube assembly incorrect (improper packing).	2
	6.	Stuffing tube or kickpipe too large for size of cable.	3
	7.	Multiple cables in a single stuffing tube or kickpipe.	2
	8.	Stuffing tube or kickpipe damaged to point where complete assembly not possible (cracked welds, damaged threads, out-of-round, etc.) if firestop material is installed.	2
C. Watertight Deck or Bulkhead Penetrations Utilizing Multiple Cable Penetration			
	1.	Insert blocks, compression bolts or filler blocks missing.	1
	2.	Improper size blocks used for size cable installed violating watertight integrity.	2
	3.	Incorrect type of RTV used to seal armored cable through MCP blocks.	1
	4.	RISE type MCP not properly sealed.	1

ATTACHMENT ***F***

SHIPBOARD ELECTRIC CABLE: DISCONNECT & RECONNECT

DATE: HULL NUMBER: JOB ORDER: WORK ORDER:

WORK ITEM NO: TITLE:

NAMEPLATE DATA:

MANUFACTURER: VOLT: AMPS:

HZ: HP: CAT#: ID#:

Calibrated Inst #:

CABLE TYPE	CIRCUIT ID	CONDUCTOR ID	LEAD COLOR	CABLE START TERM PT	CABLE END TERM PT	Megger Readings		Continuity	Cable Condition			Cable Length *
						Disconnect	Reconnect		Term Lug	Insulation	Sleeving	

* Report Cable Length for Defective Cables Only.

Disconnected by: _____ Date: _____

Reconnected by: _____ Date: _____

Remarks: _____

_____

_____

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FY-16