Protection for Vessels Engaged in Servicing Submarine Cables

Proposed Amendments to COLREGS

Brief to Navigation Safety Advisory Council
November 28, 2012 – Tampa, FL
Dr. Ronald J. Rapp
TE SubCom and Representing ICPC
Request consideration of two proposed amendments:

COLREGS Rule 18(c), which relates to fishing vessels, with the following additions:

- (iii) *If the vessel restricted in her ability to maneuver is a cable ship, the fishing vessel and its gear shall keep at least one nautical mile away.*
- (iv) *If a vessel observes a cable repair buoy, the fishing vessel shall keep the vessel and its gear at least one quarter of a nautical mile away.*

The intent is to:
- Quantify existing COLREGS language to make it more easily enforced
- Safeguard fishing vessels as well as cable ship personnel engaged in cable installation and repairs while operating under restricted maneuverability
- Allows cable operations to be performed efficiently and minimize disruptions to global communications
World Undersea Telecom Cable Critical Infrastructure

Carry more than 98% of international internet, data, and telephone traffic.

Comprise extremely high reliability components with redundant paths.
Network Security and Cable Protection

- Network security is of paramount importance to communications companies
- Cable faults can disrupt communications including financial transfers, data, voice, fax and internet
- In some cases, communications can be restored immediately
- In other cases there are not enough restoration pathways
- Satellites generally lack the required capacity and speed
- Any fault can make local and regional communications more vulnerable, in case additional damage occurs

- **Speed to repair is essential to restore communications and reduce risk of more disruption**
Structure of Modern Subsea Communications Cable

- Note fibers (often 8 to 16+) in center, copper tube to carry electrical current to power amplifiers (repeaters), polyethylene insulation
- Armor is used for areas of risk and burial shallower than 2000 m
Cable Maintenance Agreements
Zones in the Pacific and Asia
Dedicated cables ships are strategically located at ports around the world

Each ring represents one day transit time
Cable Ships - Reliance Class

• Purpose Built: 2001-2003
• 140 m length
• 5500 + MT cable capacity
• 84 persons
• 60+ days endurance

• Highly Experienced Marine Team
• Proven Heavy Weather Capable
• Equipped for Installation and Maintenance
• Highly maneuverable w/ full Dynamic Positioning
• 60 MT A Frame
• Plow and ROV equipped
• Full Cable Jointing & Testing facilities
Typical Cable Burial Installation

Note: distance of the plow from the ship, and lengths of the fiber-optic cable and tow cable, vary depending principally on sea-floor depth.
Cable Repair Cutting Drive

- Different repair methods are used in different depths and conditions
- One common method starts with the ship dragging a cutting grapnel to cut the cable
- For cables buried deeper than 1 m into the seabed, multiple cutting runs may be needed to find the cable
Cable Repair Recovering First End

- After the cutting drive, the holding drive picks up one end of the cable
- The end is tested to see if there are any more faults between it and shore
- Any damaged cable is cut out until the end tests clear to shore
Cable Repair Recovering Second End

• After any damaged cable is removed from the first end and it tests clear to shore, the first end is left on a buoy
• The second end is picked up and tested, and any damaged cable is cut out

*Buoyed cable needs to be protected from fishing vessels and gear*
Splicing Spare Cable (Initial Splice)

- After all damaged cable is removed, the ship adds a piece of spare cable long enough to reach between the ends
- Below the ship is performing the Initial Splice (first end of the spare cable)
Repair Final Splice

- The length of spare cable needed depends on the amount of cable removed and the water depth
- If much length is added, an extra repeater may be needed
- Below the ship is making the Final Splice

*Vessels engaged in splicing needs to be protected from fishing vessels and gear*
Laying Out & Burying Final Splice

- After the final splice is completed and tested, it is lowered carefully to the seabed
- The Final Splice may be buried with a Remotely Operated Vehicle (ROV) for protection, if seabed conditions allow
Cable Operations Involve Restricted Mobility

- A typical repair may take 3-5 days with ship on site, longer for bad weather or other factors
- During cable operations a ship has limited ability to maneuver, with cables or ROV umbilical in the water
- One splice may take 12-24 hours with ship stationary & cable suspended in water column
- During operations the ships, cables and equipment are vulnerable to damage by other vessels and fishing gear
Potential for Interference from Fishermen

- Radar from cableship showing more than 50 fishing vessels within a 5 km radius in the East China Sea
- More than 10 were within a mile of the cableship, causing interference with the cable operation
- Some fishing vessels approach too close, risking collision & entangling nets

**International law requires fishermen to keep vessels and gear at least 1 mile away**
Interference during operations

- These fishing vessels approached within a few metres of cable ships engaged in operations
- They did not respond to radio & physical warnings
1884 International Convention for Protection of Submarine Cable (Cable Convention) Articles 5 and 6

Article 5

- Vessels engaged in laying or repairing submarine cables shall conform to the regulations as to signals which have been, or may be, adopted by mutual agreement among the High Contracting Parties, with the view to preventing collisions at sea. When a ship engaged in repairing a cable exhibits the said signals, other vessels which see them, or are able to see them, shall withdraw to or keep at a distance of a one nautical mile at least from the ship in question, so as not to interfere with her operations. Fishing gear and nets shall be kept at the same distance.

- Nevertheless, fishing vessels which see a telegraph ship exhibiting the said signals, shall be allowed a period of 24 hours at most within which to obey the notice so given, during which time they shall not be interfered with in any way.

- The operations of telegraph ships shall be completed as quickly as possible.

Article 6

- Vessels which see, or are able to see, the buoys showing the position of a cable when the latter is being laid, is out of order, or is broken, shall keep beyond a distance of one-quarter of a nautical mile at least from said buoys. Fishing nets and gear shall be kept at the same distance.

There is precedent from 1884 Cable Convention
Summary Recommendation

• In summary, the request is to consider two amendments to COLREGS Rule 18(c), which relates to fishing vessels, with the following additions:
  • (iii) *If the vessel restricted in her ability to maneuver is a cable ship, the fishing vessel and its gear shall keep at least one nautical mile away.*
  • (iv) *If a vessel observes a cable repair buoy, the fishing vessel shall keep the vessel and its gear at least one quarter of a nautical mile away.*

Note that the proposed restriction applies only during cable operations and is a temporary inconvenience to fishing vessels.
International Cable Protection Committee

- Formed in 1958, the ICPC currently has approx 130 members, which include governments, submarine cable owners, cable ship operators, submarine cable survey companies and scientific organizations representing more than 60 nations.
- Together they own or operate over 95% of the world’s submarine telecom cables and almost all of the cable ships that lay and repair these cables.
- A significant number of submarine power cables are also represented within the ICPC.
- The principal goal of the ICPC is to promote the safeguarding of submarine cables from human and natural hazards.
- As a service to the world’s seabed users, the ICPC provides professional recommendations related to submarine cable planning, installation, operation, maintenance and protection.
- Information on the ICPC can be found on its website www.iscpc.org.
TE SubCom (SubCom)

• TE SubCom (SubCom), a TE Connectivity Ltd. company, is an industry pioneer in undersea communications technology and marine services and a leading global supplier for today’s undersea communications requirements.

• The company designs, manufactures and installs systems around the world, and has deployed more than 490,000km of subsea communication cable—or enough to circle the earth more than 12 times at the equator.

• SubCom’s global presence, backed by industry leading research and development laboratories, manufacturing facilities, installation and maintenance ships, depots, and management team work together to implement integrated solutions and network upgrades, with unsurpassed reliability, that support the needs of telecommunications, internet providers, offshore and science customers worldwide.

• For more information visit www.SubCom.com
Why is this Important

• Amending COLREGS as recommended in this submission will reduce the risk of collision between cable ships engaged in laying and repair of submarine cables.

• But more importantly, it will speed the repair of critical submarine cable infrastructure. This is vital not only to the United States economy but to the global economy.

• The ICPC hopes that the United States will favorably consider this recommendation and take steps to reach out to other like-minded governments so that COLREGS can be amended for the benefit of all.
Thank You!

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