International Cable Protection Committee Ltd.

12 Fratton Road | Portsmouth PO1 5BX | United Kingdom
+1 541 306 1549 | general.manager@iscpc.org | www.iscpc.org

January 20, 2023

BY E-MAIL

Shri Sanjeev Kumar Sharma
Advisor (Broadband and Policy Analysis)
Telecom Regulatory Authority of India
Mahanagar Doorsanchar Bhawan
Jawahar Lal Nehru Marg
New Delhi – 110002
advbbpa@trai.gov.in
jtadvbbpa-1@trai.gov.in

Re: Consultation Paper on Licensing Framework and Regulatory Mechanism for Submarine Cable Landing in India, No.15/2022

Dear Shri Sharma:

The International Cable Protection Committee ("ICPC") is pleased to submit these comments on the *Consultation Paper on Licensing Framework and Regulatory Mechanism for Submarine Cable Landing in India*, No.15/2022 (issued December 23, 2022) (the "Submarine Cable Consultation Paper") issued by the Telecommunications Regulatory Authority of India ("TRAI"). The ICPC is the world's premier submarine cable protection organization. It was formed in 1958 to promote the protection of submarine cables against man-made and natural hazards to ensure national and international communications connectivity. It has promulgated recommendations and best practices for cable protection and engages with stakeholders and governments globally to promote submarine cable protection. The ICPC has over 180 members from over 60 nations, including India. These members consist of cable operators, owners, manufacturers, and industry service providers, as well as governments.

In part I of these comments, ICPC discusses the importance submarine cable infrastructure and owners' and operators' reliance on open regulatory regimes in deploying and maintaining such infrastructure. In part II, ICPC explains that transparent, efficient permitting processes, not protectionist ownership requirements, are key to ensuring submarine cable are repaired expeditiously, and in part III, ICPC identifies specific streamlining proposals that would improve India's permitting regime and increase the attractiveness of India as a location for landing submarine cables—which are "critical not

only for the global digital economy and [sic] but also for India becoming a hub for Data Centre and CDN [content delivery networks]."[1]

I. Construction and Maintenance of Submarine Cables Depends on a Stable and Open Regulatory Environment

Submarine cables carry approximately 99 percent of the world's international Internet, voice, and data traffic. Installation, operation, and timely repair of submarine cables support a broad range of human activities, including: Internet connectivity and electronic commerce; global payment networks; backhaul of mobile wireless communications; government communications; remote work and video conferencing; tele-medicine; and tele-education. They connect developed and developing states. India is served by more than a dozen cables, with seven new cables scheduled to land in India in the next few years. Indian submarine cable operators have also played a large role in development and operation of global submarine cable networks over the past 20 years.

Submarine cables are distinctive among activities, as they involve long-term fixed infrastructure resting on the seabed. Consequently, it is critical that governments—including the Government of India—establish clear, stable, and transparent regulatory regimes that enhance regulatory certainty and ultimately encourage the timely deployment and repair of submarine cables.

Although damage to submarine cables is infrequent, it is most often caused by human activities such as commercial fishing (in which trawl nets, clam dredges, and other bottom-contact gear ensnare cables), vessel anchoring, dredging related to sand and mineral extraction, petroleum and natural gas extraction, pipeline construction and maintenance, renewable energy construction and maintenance, and other seabed activity. On rare occasions, submarine cables have been subject to malicious attacks. (Submarine cables cannot be concealed or hidden, as mariners need to know of their locations in order to avoid damaging them.) Submarine cables are also at risk from natural hazards, such as hurricanes, underwater landslides, and seismic events such as earthquakes and tsunamis.

Damage to submarine cables can pose significant risks to India's national security and the Indian economy. Cable damage can result in significant disruptions of communications and slower Internet speeds. Given the risks to submarine cables, timely repairs are particularly critical, and maintenance providers must be prepared to respond rapidly with their cable ships, which remain on stand-by with continuously-qualified personnel and appropriate equipment. These ships are built specifically for cable-related operations and are crewed by highly trained and experienced merchant mariners, submersible engineers, and cable operations staff. Yet, in India, the ability of these cable ships to deploy quickly is hampered significantly by unnecessarily complex and time-consuming permitting processes.

---

[1] Submarine Cable Consultation Paper at § 2.18. *See also*, Consultation Paper on Ease of Doing Business in Telecom and Broadcasting Sector, No. 9/2021, § 337 (issued December 21, 2021) ("Ease of Doing Business Consultation Paper").

As TRAI points out in the Submarine Cable Consultation Paper, "There is need of an end-to-end simplified procedures for the operation and maintenance of the undersea cable which includes permission for the ships to land, the important of equipment, measurement tools, etc."[2] While cable ships may not always need to enter port—and indeed have no need to import equipment *per se* (as most equipment remains on the specialized cable ships), ICPC agrees that a simplified permitting process is needed—one that facilitates submarine cable repair by the experienced cable repair ships standing by to complete the repairs, and without any protectionist ownership requirements that will serve only to deter further investments in submarine cable infrastructure in India. Furthermore, the timely approval of the cable ship crews (Ministry of Home Affairs ("MHA") clearance) within one month is essential.

II. The Government of India Should Decline to Adopt Protectionist or Discriminatory Measures in Favour of an Indian-Flagged Cable Ship and Instead Work to Improve the Permitting Environment for All Cable Ships

The Government of India should decline to adopt protectionist or discriminatory measures in favour of an Indian-flagged cable ship and instead work to improve the permitting environment for all cable ships, regardless of flag, ownership, or crew. Consequently, in response to Submarine Cable Consultation Question 3, in which TRAI asks whether "an undersea cable repair vessel owned by an Indian entity help overcome the issues related to delays in undersea cable maintenance?," the ICPC believes that an Indian-flagged cable ship would not address any delays in submarine cable maintenance.

The ICPC believes that permitting issues—rather than a lack of domestically-flagged cable ship capabilities—delays installations and repairs in India. In Section 2.19 of the Submarine Cable Consultation Paper, TRAI simply notes:

> Such an indigenous arrangement [an Indian-flagged cable ship] can ease the requirement of some permits and customs duty implications. Indian Flagged vessel can be arranged in short notice and most of permits can be pre-arranged, being Indian operation.

By imposing a flag restriction for installation or repair in Indian areas of jurisdiction,[3] the Government of India would limit access to installation and repair services, increase repair times, and render them more expensive by disrupting the global market for installation and repair services. Ultimately, such protectionist measures undermine the resilience of submarine cable networks. Consistent with Section 10 of the *ICPC Best Practices for*

---

[2] Submarine Cable Consultation Paper § 1.16.

[3] Within the EEZ and on the continental shelf, vessel flag restrictions are inconsistent with the United Nations Convention on the Law of the Sea ("UNCLOS"), to which India is a party, and which provide in articles 79 and 87 for the freedom to install, maintain, and repair submarine cables in those maritime zones. Although UNCLOS permits such restrictions within the territorial sea, they are inadvisable for the reasons noted elsewhere in the ICPC's comments.

Governments,[4] attached as Exhibit A, the ICPC recommends that the Government of India decline to adopt flag restrictions for cable ships, whether expressly or by maintaining the requirement for an Indian National Shipowners' Association ("INSA") clearance in the event there were an Indian-flagged cable ship.[5] Even if flag restrictions are imposed, they should apply only to the Territorial Sea ("TS") of India to 12 nautical miles not to the 200 mile Exclusive Economic Zone ("EEZ").

Cable ships are built specifically for cable-related operations and are crewed by highly trained and experienced merchant mariners, engineers, and cable operations staff. Most of the world's countries with submarine cable landings and transits lack locally-flagged and locally-crewed cable ships. Instead, most of the world's installation and repair services are provided by global and regional providers with the necessary expertise and economies of scale. Submarine cable operators often pool risks and resources to contract for cable ships in regional zone agreements, including the Southeast Asia and Indian Ocean Cable Maintenance Agreement in the Indian Ocean. These zone arrangements cover vast multinational geographic areas, meaning that there are no discrete national maintenance markets.

Vessel flag restrictions render installations and repairs more expensive by impairing the operation and economies of scale of zone agreements and private maintenance agreements. Such restrictions can also greatly delay critical repairs, as the lack of availability of the domestically-flagged ship requires a submarine cable operator to wait to qualify a foreign-flagged ship through an INSA clearance or other exemption or waiver.

III. The Government of India Should Undertake Specific Measures to Improve the Openness, Transparency, and Timeliness of Permits for All Cable Ships

Consistent with Section 9 of the *ICPC Best Practices for Governments*, the Government of India should seek to ensure that its permit requirements for installation and repair are open, transparent, establish clear timeframes, and are as short as possible. Indeed, TRAI itself has noted the need for broader permitting reform, acknowledging key stakeholder comments in its Ease of Doing Business Consultation Paper that "Indian national legislation does not fully support the facilitation of the repair of submarine cables within Indian maritime zones due to the various permits that need to be obtained by the operations and maintenance (O&M) agencies before repair operations begin. The problem with the process of obtaining the permits is that it runs across *seven* Government authorities."[6] TRAI summarized the permitting process as follows:

---

4 Int'l Cable Protection Comm., Government Best Practices for Protecting and Promoting Resilience of Submarine Telecommunications Cables (2022), https://www.iscpc.org/publications/icpc-best-practices/. ("*ICPC Best Practices for Governments"*).

5 Ease of Doing Business Consultation Paper § 3.47.

6 Ease of Doing Business Consultation Paper § 3.38 (emphasis added).

- Four permits are necessary when a cable ship is in transit for emergency repairs in the Indian Ocean region:
  - MHA pre-clearance of personnel engaged in the repair (applied for annually, 3-4 months in advance);[7]
  - Ministry of Defence ("MOD") clearance for repair to undergo Naval Security Inspection (valid for 6 months, with a processing time of 7-14 days);
  - INSA Clearance to check whether an India flagged ship has capacity (processing time of 3-4 days); and
  - Specified Period License application for repair (processing time of 3-5 days).

In addition, the following "pre-repair" clearances are required:

- Import and customs clearance, with requirement to furnish bond (processing time of about 30 working days);
- Vessel "conversion" at Indian port (for territorial sea repairs);
- Naval inspection and security clearance (processing time of 1-5 days); and
- Port clearance.

There are also additional "post-repair" export "formalities" that are required before a cable repair vessel can deploy to where it is next needed, including the assessment of customs duties for goods consumed, which require a return to port and can take another 10 working days.[8]

Streamlining such a complex and time-consuming permitting process should be considered as a first step to ensuring that submarine cables deployed in India TS and the EEZ are repaired expeditiously. Below, the ICPC addresses more specific permitting issues and recommendations.[9]

A. The Government of India Should Eliminate the INSA Clearance Requirement for Cable Ships

Consistent with Section 10 of the *ICPC Best Practices for Governments*, the Government of India should eliminate the INSA clearance requirement for cable ships. There

---

[7] As noted in part B below, some applications are submitted up to six months in advance.

[8] Ease of Doing Business Consultation Paper §§ 341-356.

[9] Please also refer to Ronald J. Rapp et al., *India's Critical Role in the Resilience of the Global Undersea Communications Cable Infrastructure*, 36 Strategic Analysis 375 (2012), attached as Exhibit B, for a discussion of the importance of undersea cables to India's economy and security, which includes specific recommendations for streamlining permitting procedures and securing India's national interests.

is no need to take 3 to 4 days simply to determine whether an India flagged vessel is capable of performing the repair. Even if such a vessel is capable, it may not be available—and in any event no such vessel currently exists, making the underlying permit requirement unnecessary.

B. The Government of India Should Shorten the Time Required for MHA Clearances to One Month

The review and approval of cable ship crew members and specialists by MHA should be shortened to one month to address the uncertainty in available crews due to market and health conditions (in particular, COVID). The current process of submitting up to 200 names per vessel up to six months in advance with hopes that 60 will be available when approvals are received results in more work for government officials and does not guarantee that the correct crew will be available when the work is actually started. Submitting 70 names one month in advance will reduce workloads and provide more certainty that these crew are available for the work.

C. The Government of India Should Eliminate the Requirement for Temporary Importation of a Cable Ship Into Indian Territory

Consistent with Section 12 of the *ICPC Best Practices for Governments*, the Government of India should eliminate the requirement for temporary importation of a cable ship into Indian territory. As noted above, the processing time for this permit is approximately 30 working days—an extremely long period of time when a cable needs urgent repair. Moreover, the requirement to post a bond in the value of the vessel can impose financial hardship, unnecessary given that the bond is cancelled when the ship is "exported". These customs requirements do not appear to serve any policy objective and should be eliminated to facilitate timely repairs.

D. The Government of India Should Reduce or Eliminate Customs Duties, Taxes, and Fees on Submarine Cable-Related Activities and Materials

Consistent with Section 12 of the *ICPC Best Practices for Governments*, the Government of India should reduce or eliminate customs duties, taxes, and fees on submarine cable-related activities and materials. Currently, Global Sales Tax (GST) on services (cable installation and repair) are applied for work out to 200 nautical mile limit of the EEZ. Such revenue-raising activities increase the costs of installation and may deter new landings. They may also require paperwork and give rise to disputes that can delay installations and repairs. Consistent with UNCLOS articles 2, 58, 79, and 87, the Government of India should refrain from imposing such customs duties, taxes, and fees beyond the India TS.

Imposing customs duties on spare telecommunications cables intended for repair operations and stored locally in depots is also detrimental to encouraging submarine cable owners, operators, and maintenance providers to store needed cable locally in India-based

depots. The detrimental impact is that repairs takes longer while spare cable is transported from distant ports and telecommunication services are interrupted for a longer period of time.

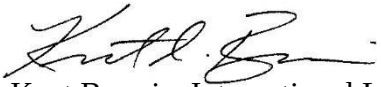
E. The Government of India Should Streamline Port Entry Requirements

Consistent with Section 11 of the *ICPC Best Practices for Governments*, the ICPC recommends that the Government of India streamline its port entry requirements. India current requires port entry of a cable ship for regulatory clearance purposes for each installation or repair event, even when crew members would not otherwise embark or disembark and even when the activity is conducted in the EEZ beyond the TS. Such requirements disrupt operations and delay installation and repair. India should establish annual pre-clearance procedures for cable ships and crews for work within the Indian TS, and refrain from requiring port entry for cable ships conducting installations and repairs beyond the Indian TS.

IV. The Government of India Should Seek to Foster Investment in New Cable Ships

India is a vital connectivity point for submarine telecommunications infrastructure connecting points around the globe, and India seeks to expand its position as a global communications hub by encouraging additional submarine cable landings and facilitating repairs. As discussed above, rather than taking a protectionist approach that focuses on India ownership, India should ensure that cable owners, operators, and maintenance service providers may expeditiously deploy and maintain their infrastructure, leveraging existing, time-tested zone arrangements with highly experienced, specialized crews. Of course, India should of encourage India-based investment as well, and the addition of new cable repair ships intended to add to rather than replace existing fleets would benefit the entire industry, both by adding new vessels capable of being deployed and by facilitating competition. Assuming there is a level regulatory playing field in place, service providers would compete on responsiveness, price, and service—competition that the submarine cable industry would welcome.

Yours sincerely,



Kent Bressie, International Law Adviser

VERSION 1.2

EXHIBIT A:

GOVERNMENT BEST PRACTICES FOR PROTECTING AND PROMOTING RESILIENCE OF SUBMARINE TELECOMMUNICATIONS CABLES

With these Best Practices, the International Cable Protection Committee ("ICPC") identifies recommended actions for governments to foster the development and protection of submarine telecommunications cables and to maintain continuity of communications even in the event of damage to a submarine cable. In implementing these Best Practices, a state should adapt them to address national and regional circumstances, including but not limited to: localized risks to submarine cables; localized activities of other marine industries; national laws, regulations, and governmental structures; and jurisdictional disputes with littoral states.

1. General principles

In adopting and implementing a submarine cable resilience plan, the state should be guided by the following principles:

- Focus on statistically-significant risks where government action could have the greatest impact on risk reduction;
- Promote commercial and regulatory environments that encourage multiple and diverse (both with domestic and foreign landings) submarine cable landings within the state's territory;
- Observe and implement treaty obligations (particularly under the United Nations Convention on the Law of the Sea ("UNCLOS")) and customary international law defining state jurisdiction over, and protection of, submarine cables;
- Promote transparent regulatory regimes that expedite cable deployment and repair according to well-established timeframes;
- Consult closely with industry to understand industry technology and operating parameters and to share data regarding risks;
- Complement existing industry best practices;
- Recognize that laws and government policies themselves can sometimes exacerbate risks of damage and reduce resilience; and
- Engage with other states on a global and regional basis, as other states' actions can greatly affect an individual state's own connectivity.

2. Fishing and anchoring risks

ICPC statistics indicate that each year, fishing and anchoring account for approximately 70 percent of global damage to submarine cables—far more than other human or natural causes. Commercial fishing-related damage is most often caused by bottom-tending fishing gear such as trawl nets and dredges, but it is also caused by long lines and fish aggregation devices anchored to the seabed and pot and trap fisheries using grapnels for gear retrieval. Anchor-related damage is most often caused by: improperly-stowed anchors, which release or fall overboard and can be

dragged for great lengths along the sea floor, damaging cables along the anchor's path; anchoring outside of approved anchorages and near installed submarine cables; anchors dragged by properly-anchored vessels, depending on sea conditions; and dropping of anchors in marine emergencies. Mooring lines of fish aggregating devices ("FADs"), especially in deep-water can cause abrasion to submarine cables during installation, and FAD anchors have caused damage to deployed cables.

The submarine cable industry uses a variety of mitigation measures to limit damage from fishing and anchoring, including: route selection and design to avoid areas of particular risk (for example, routing around designated anchorages); cable armoring; cable burial (from 0.5 meters to 3 meters) for cable installed at water depths less than 1500 meters, where seabed conditions permit; cable awareness and liaison programs designed to educate fishing fleets regarding the location of submarine cables, and actions to take if gear is snagged; and programs to compensate fishermen for snagged gear (so that they abandon snagged gear rather than damage cables in trying to free it). Coordination with FAD owners and with governments to obtain FAD positions so cables can be routed around them, and/or measures to relocate or recover FADs in coordination with the owners have proven beneficial. These industry self-help measures can be effective, but they are insufficient absent additional actions to be taken by governments.

ICPC statistics confirm that state adoption and implementation of effective cable protection measures directed at fishing and anchoring risks can greatly reduce the risk of damage to submarine cables. As best practices, ICPC recommends that states therefore adopt and implement the following measures:

- Prohibit fishing in close proximity to submarine cables—including deployment of drift nets, gill nets, fish aggregation devices, and vessel anchors—consistent with default and minimum separation distances discussed in part 3 below;
- Require use of designated anchorages and establish and prosecute legal offenses for anchoring outside of designated anchorages;
- Promote the distribution and use of cable awareness charts (prepared by submarine cable operators) to fishermen;
- Promote direct engagement between submarine cable operators, including establishment of fishing-cable committees that can compensate fishermen for snagged and lost gear in exchange for not risking cable damage through gear retrieval efforts;
- Require use of automated identification systems ("AIS") and vessel monitoring systems ("VMS") on vessels at all times and establish and prosecute legal offenses where vessel operators turn off or disable AIS or VMS;
- Require that vessel operators carry appropriate insurance;
- Require use of AIS or VMS by even the smallest of vessels; and
- Direct the coast guard to issue local notices to mariners regarding submarine cable protection and to communicate with vessels operating or drifting near submarine cables.
- Limit deployment of FADs proximate to installed and planned submarine cables.

- Establish a FAD registry, requiring FAD owners to identify and update FAD locations, and make such registry available to submarine cable operators during the route planning process for new cables.
- Require removal of ropes and ghost gear in the water column and consider removal requirements for end-of-life disposition of FADs.

3. Spatial separation

Spatial separation of submarine cables from other marine activities is one of the effective means of cable protection. It minimizes the risk of damage from other marine activities and ensures that submarine cable operators have ready and unfettered access to their cables for installation and maintenance needs and to minimize outage time in connection with a repair. The oceans, however, are increasingly crowded spaces where ideal spatial separation might not be possible, and where marine industries make compromises regarding proximity while seeking to reduce risk through closer coordination and communication.

A default separation distance establishes a minimum separation distance between an existing submarine cable and another marine or coastal activity in the absence of any mutual agreement to allow the activity in closer proximity to the submarine cable. By contrast, a minimum separation distance establishes an absolute minimum separation distance between the submarine cable and the other marine or coastal activity. Consistent with ICPC recommendations, many countries—as diverse as China, Denmark, Russia, Singapore, and the United Kingdom—have established default or minimum separation distances to protect submarine cables.

Some states have established cable protection zones and corridors that prohibit specified activities posing risks to submarine cables—including fishing, anchoring, and dredging—within fixed geographic areas. Discretionary cable protection zones grant protections to submarine cables that choose to locate in them or that may be declared around them, as in the case of Australia. Mandatory cable protection zones (or cable corridors) require submarine cable operators to route their infrastructure in defined geographic areas (as in the case of New Zealand). States with cable protection zones enforce them with air and sea patrols and infringement penalties. Submarine cable operators generally disfavor mandatory cable protection zones and corridors because they (1) provide insufficient spatial separation from other submarine cables for installation and maintenance and (2) encourage geographic clustering of submarine cable routes and landings, which magnifies the risk that a single natural or man-made event could damage multiple cables.

As best practices to promote spatial separation, ICPC recommends that states:

- Adopt and enforce the following recommended separation distances between cable ships and other vessels in the exclusive economic zone ("EEZ," extending 200 nautical miles seaward from the shore) and the territorial sea (extending 12 nautical miles seaward from the shore):

  - In shallow water with a depth of 75 meters or less: 500 meters; and
  - In greater depts of water: the greater of 500 meters or two times the depth of water;
- Implement on nautical charts the text box specified in International Hydrographic Organization ("IHO") Resolution 4/1967 (amended April 2017), as discussed in part 4 below;
- Ensure that any cable protection zones are adopted with consultation and support of cable operators; and
- Maintain flexibility with the number and size of cable protection zones.

4. Charting

Nautical charts (such as Admiralty charts) issued by government hydrographic offices consistent with IHO recommendations are graphical representations of ocean and adjacent coastal areas showing, among other things, water depths, seabed and coastline details, tidal information, and human-made features such as harbors, munitions dumps, offshore wind farms, and submarine cables. Nautical charts aid in navigation and alert users to the presence of other ocean activities. Nautical charts were previously issued periodically in paper form, but they are now generally maintained in electronic form and available on a computer screen or using a print-on-demand function.

Submarine cables are charted using data provided by operators and their contractors to hydrographic offices (such as the U.K. Hydrographic Office, the Indian Naval Hydrographic Office, the South African Navy Hydrographic Office, and the Hydrographic Department of the Maritime and Port Authority of Singapore). Historically, the IHO recommended charting only to a depth of 2,000 meters, in light of a focus on safety at sea. Some submarine cable operators still charted their cables at all depths. In 2018, however, the IHO revised its approach, due in part to a recognition that charting of submarine cables in areas proximate to deep seabed mining could reduce the risk of cable damage. The IHO and ICPC have established a pilot program to chart cables in areas proximate to contract areas of the International Seabed Authority.

As best practices for charting, ICPC recommends that states adopt and implement the following measures:

- Update nautical charts regularly and in near-real-time;
- Show all submarine cables on nautical charts, distinguishing between in-service and out-of-service cables;
- Show on nautical charts all other human activities that could pose risks to submarine cables, including but not limited to mining areas (including sand and gravel borrow areas), renewable energy facilities, traffic separation schemes, munitions dumps, and military test areas;

- Ensure that national and regional charting authorities implement amended IHO Resolution 4/1967, which requires that charting authorities include a text box in publications such as mariners' handbooks and notices to mariners:
    - Directing vessels to avoid anchoring, fishing, mining, dredging, or engaging in underwater operations near cables at a minimum distance of 0.25-nautical mile on either side of a cable, and
    - Recognizing submarine cables as critical infrastructure, noting that damage to a submarine cable can constitute a national disaster.

5. Domestic cable protection laws; penalties for damage

The 1884 Convention on the Protection of Submarine Telegraph Cables requires state parties to establish offenses for cable damage. Article 113 of the UNCLOS provides that every state shall adopt the laws and regulations establishing a punishable offense under national law for the breaking or injury by a ship flying its flag or by a person subject to its jurisdiction of a submarine cable beneath the high seas done wilfully or through culpable negligence.

Countries such as Australia and New Zealand have implemented these treaty obligations by establishing substantial penalties—particularly with respect to their cable protection zones—that are more likely to deter those who might damage submarine cables. Other countries such as Sweden impose strict liability, requiring that if the owner of a cable or pipeline causes damage to another cable or pipeline, the owner shall pay the cost of repairing the damage. By contrast, countries such as the United States adopted penalties to implement their 1884 Convention obligations but have not updated the penalty amounts for more than 130 years. Finally, many other states have failed to adopt any measures to punish cable damage, even when their treaty obligations require them to do so.

To implement their treaty obligations, to compensate cable owners for damage, and to deter future damage, particularly by commercial fishermen and vessel anchors, ICPC recommends that states:

- Adopt and enforce effective cable protection laws, consistent with the 1884 Convention and UNCLOS;
- Adopt and update penalties to ensure they are substantial enough to deter damage; and
- Ensure that coast guards and law enforcement agencies are sufficiently familiar with cable protection laws to enforce them, and that they cooperate with and assist cable operators in investigating cable damage claims (including preservation and sharing of evidentiary material).

6. Marine spatial planning and inter-industry coordination

Governmental bodies and other marine industries are often unfamiliar with the presence of, operational requirements for, vulnerabilities of, status as critical telecommunications

infrastructure of, and statutory and treaty protections that apply to, submarine cables. In some cases, marine spatial planning activities omit submarine cables entirely. This lack of familiarity with, or neglect of, submarine cables can greatly impair their protection and resilience.

As best practices, ICPC recommends that states undertake the following to protect cables and de-conflict cable routes:

- Include and consult with submarine cable operators as stakeholders in such processes;
- Identify submarine cables in their mapping resources and tools (not just on nautical charts);
- Identify and include submarine cable operators as critical stakeholders in marine spatial planning and policymaking;
- Adopt regulatory frameworks for other marine activities, such as oil and gas development and renewable energy installations, to require coordination with submarine cables at the earliest stage of planning and development of those other projects; and
- Ensure that planning and leasing documents for oil, gas, and renewables specifically reference submarine cable protection and coordination.

7. Single point of contact

Submarine cable development, installation, operation, and repair implicates the regulatory and policy responsibilities of numerous government agencies, including those ministries, departments, and agencies responsible for telecommunications, maritime and shipping, environment, customs, and national security, to name a few. The dispersion of responsibilities for submarine cables can impair government action with respect to submarine cables and also make it difficult for other industries to coordinate with submarine cables. Singapore has addressed this issue by designating its telecoms regulator, the IMDA, as the point of contact for submarine cables, even if other government bodies have ultimate responsibility for a particular issue.

As a best practice, ICPC recommends that states:

- Establish a single point of contact for submarine cables—and not just for permitting purposes, but also for any issues arising with respect to installation, repair, and protection.

8. Route and landing optimization; geographic diversity

Submarine cable operators consider a variety of factors when choosing routes and landings, including:

- Economic need (for connections between data centers and points of presence, and on highly-trafficked routes);
- Economic opportunity (in the case of wholesale capacity sales);

- Seafloor topography (seeking flat and uninteresting seabed that avoids geographic features with steep gradients, seamounts, vents, or fracture zones);
- Geographic diversity (to minimize the impact of a single event causing damage to multiple cables);
- Proximity to other marine activities and infrastructure (which pose risks of damage);
- Access to terrestrial networks (to ensure secure, diverse, and low-cost connectivity between submarine and terrestrial networks);
- Environmental restrictions (such as marine protected areas); and
- Regulatory considerations (including length and expense of permitting).

They design routes to follow the shortest viable route between landing points exhibiting the lowest risk to the installed cable. They start with a great circle route (the shortest distance between two points on a globe), which provides the lowest latentcy for communications transmissions (the time taken for data to pass from point A to point B) and then adjust for technical, economic, and regulatory factors.

Submarine cable operators and their capacity customers increasingly seek to maximize geographic diversity of submarine cable routes and landings in order to enhance network resilience and reduce the risk of damage from a single event, whether an earthquake, a tsunami, a vessel anchor, fishing gear, or a terrorist attack. Their options may be limited by other factors, such as slow and expensive permitting, coastal landowners, and marine protected areas. Moreover, they operate in dynamic coastal and marine environments that are increasingly crowded and that lack a single landowner or a single regulator. Other activities and infrastructure are frequently authorized without regard to the potential to foreclose particular areas to future submarine cable development, increasing the potential for clustering of cables and landings, and the risks inherent in non-diverse infrastructure.

As best practices, ICPC recommends that states undertake the following to promote resilience of submarine cable networks:

- Adopt and implement regulatory frameworks to optimize routes and landings, including geographic diversity of routes and landings;
- Recognize that diversity can be impaired by government shore-end permitting, marine protected areas, and marine spatial planning (or lack thereof) that results in clustering of cables, magnifying risk that a single incident will damage multiple cables and impair connectivity; and
- Recognize that submarine cables cannot be hidden or armored and buried to guard against all malicious and non-malicious sources of cable damage.

9. Permitting for installation and repair

As noted in part 8 above, permitting can greatly affect route and landing location decisions for submarine cable operators. In many cases, coastal states apply a “one-size-fits-all” permitting

regime that applies equally to polluting activities (such as oil and gas development) and environmentally-benign activities (like submarine cables), which can burden and delay the environmentally-benign activities.

Moreover, the permitting actions of one state can greatly affect the connectivity of other states. UNCLOS articles 2, 58, 79, and 87 authorizes a coastal state to impose conditions and consent requirements for submarine cables entering its territorial sea, but not beyond it in the EEZ or on the continental shelf. UNCLOS articles 2 and 51 also allow archipelagic states to impose conditions for new submarine cables entering archipelagic waters.

As best practices, ICPC recommends that states ensure that permit requirements for installation and repair:

- Are consistent with UNCLOS in the EEZ and archipelagic waters and on the continental shelf—excessive jurisdictional assertions by one's neighbors can impair installation of new cables and repairs of existing ones;
- Reflect the best available science showing that submarine cables are neutral-to-benign in the marine environment;
- Are transparent;
- Establish clear timeframes that are as short as possible; and
- Promote diversity of routes and landings.

10. Cabotage and crewing restrictions

Cabotage is the transport of goods and passengers between domestic ports. For a variety of reasons, including protection of domestic industry and national security, a number of states have restricted cabotage to domestic vessels, with varying criteria including domestically-built, domestically-owned, domestically-flagged, and/or domestically-crewed vessels. Some states have expanded their cabotage restrictions to a broader range of economic activities in their territorial seas and EEZs, including submarine cable installation and repair. Application of cabotage laws to submarine cable installation and repair is inappropriate and undermines the resilience of submarine cable networks.

Cable ships are built specifically for cable-related operations and are crewed by highly trained and experienced merchant mariners, engineers, and cable operations staff. Most of the world's countries with submarine cable landings and transits lack locally-flagged and locally-crewed cable ships. Instead, most of the world's installation and repair services are provided by a few global and regional providers with the necessary expertise and economies of scale. Submarine cable operators often pool risks and resources to contract for cable ships in regional zone agreements. These zone arrangements cover vast multinational geographic areas, meaning that there are no discrete national maintenance markets.

Cabotage and crewing restrictions render installations and repairs more expensive and can result in performance and safety problems arising from the use of inappropriate vessels and inexperienced crew. They generally impair the operation and economies of scale of maintenance consortia. Cabotage and crewing restrictions can also greatly delay critical repairs, as a submarine cable operator must wait to qualify a foreign-flagged/crewed vessel through an exemption or waiver process. Cabotage and crewing restrictions can harm the connectivity of other neighboring countries.

Within the EEZ and on the continental shelf, cabotage and crewing restrictions are inconsistent with UNCLOS articles 79 and 87, which provide for the freedom to install, maintain, and repair submarine cables in those maritime zones. Within archipelagic waters, cabotage restrictions on repair of existing cables that merely transit the state are inconsistent with UNCLOS article 51. Although permissible within the territorial sea, cabotage and crewing restrictions are inadvisable.

As best practices, ICPC recommends that states:

- Refrain from defining submarine cable installation and repair as cabotage, as they do not involve the transport of goods or passengers between domestic ports;
- Refrain from applying cabotage or crewing restrictions on vessels engaged in installation or repair, whether in the territorial sea, archipelagic waters, or EEZ/continental shelf.

11. Port entry requirements

Based on installation or repair work within the territorial sea, archipelagic waters, or EEZ, some states require that a cable ship enter a domestic port for regulatory clearance purposes, even when crew members would not otherwise embark or disembark. Such requirements disrupt operations and delay installation and repair.

As best practices, ICPC recommends that states:

- Refrain from requiring port entry for cable ships conducting installations and repairs beyond the territorial sea; and
- For work within the territorial sea and archipelagic waters, establish annual pre-clearance procedures for cable ships and crews.

12. Customs duties, taxes, and fees

Some states view the entry of new submarine cables into their jurisdictions as an opportunity to extract revenue from the operator in the form of customs duties, taxes, and fees. Such charges increase the cost of capacity to users and in some cases can deter landings, thereby undermining government policies designed to foster new cable landings. Such charges can also serve as a source of disputes that delay installation and repair.

As noted in part 9 above, UNCLOS articles 2, 58, 79, and 87 authorizes a coastal state to impose conditions for submarine cables entering its territorial sea, but not beyond it. UNCLOS articles 2 and 51 also allow archipelagic states to impose conditions for new submarine cables entering archipelagic waters. Some states, however, have sought to impose customs duties, taxes, and fees for activities and infrastructure in the EEZ and on the continental shelf, in contravention of UNCLOS.

As best practices, ICPC recommends that states:

- Refrain from imposing customs duties, taxes, and fees on installation activities beyond the limits of the territorial sea, and on cable ships merely transiting an EEZ;
- Reduce or eliminate customs duties on submarine cable equipment imported into a state's territory, in order to foster submarine cable deployment and facilitate quick access to spare plant for repair; and
- Refrain from imposing importation requirements and customs duties on cable ships conducting installation or repair.

13. Maritime boundary claims and disputes

Competing maritime boundary claims and boundary disputes can impede installation and even foreclose certain routes. Such disputes can also greatly delay repairs due to duplicative and time-consuming permit requirements. In some cases, boundary disputes pose a danger to the cable ship and its crew due to the threat of military action.

As best practices, ICPC recommends that states:

- Facilitate installation and repair without prejudice to any maritime boundary claim; and
- Recognize that submarine cable operators seek to remain neutral in boundary disputes and seek to conduct their activities without prejudice to such disputes.

14. Critical infrastructure designation

Critical infrastructure is generally understood to include assets that are essential for the functioning of society and the economy, and damage or destruction of which would harm national and economic security, public health, and public safety. Governments use critical infrastructure designations to highlight asset criticality and to identify and mitigate vulnerabilities and threats through specific laws and policies.

As best practices, ICPC recommends that states:

- Designate submarine cables as critical infrastructure;
- Gather and assess data regarding vulnerabilities of, and threats to, submarine cables; and
- Develop and implement policies to reduce those vulnerabilities and threats.

15. Sharing of risk and incident data

Sharing of risk and incident data between operators and governments and among operators is useful for identifying patterns of activity, gaps in existing cable protection efforts, areas for improving resilience, and identification of malicious acts by state and non-state actors.

As a best practice, ICPC recommends that states:

- Consistent with competition laws, establish mechanisms for exchanging incident data and threat information.

16. Impact of other high-seas regulatory activities

Regulatory activities of other states, bodies, and institutions far beyond a state's maritime boundaries can impair submarine cable installation, repair, and resilience. Such activities include uncoordinated deep seabed mining and environmental regulation on the high seas under the proposed treatyto conserve and promote sustainable use of biodiversity beyond national jurisdiction ("BBNJ").

Deep seabed mining poses risks of: damage to existing submarine cables, increasing the risk of a communications blackout for certain countries, and route foreclosure for new submarine cables, rendering them less resilient. Some mining contractors have argued either that cable owners proceed at their own risk or that mining contractors have a right to exclude submarine cables from their contract areas, which cover vast areas of the seabed. UNCLOS does not establish any specific coordination mechanisms, including instead only mutual "due regard" and "reasonable regard" obligations. The Exploration Regulations adopted by International Seabed Authority ("ISA") do not address submarine cables at all. Based on a joint proposal by the ICPC and France, with support from numerous other developing and developed states, the Draft Exploitation Regulations now contain provisions to ensure early coordination between mining and submarine cables, to protect existing submarine cables, and to permit future submarine cables. Although the ISA's jurisdiction, and the potential for mining, extends globally throughout the Area (the seabed and subsoil of the high seas), the greatest number of mining contract areas current exist in the Indian and Pacific Oceans.

The proposed BBNJ treaty to promote conservation and sustainable use of BBNJ could impair submarine cable protection and resilience. Specifically, the treaty could require environmental impact assessments ("EIAs") for cables in high seas areas, restrict cable transits and repairs in new marine protected areas on the high seas, and create a new international regulatory body to oversee such activities. Many of the proposals under consideration by the treaty conference would impose significant costs and delays on new builds and repairs and result in cable routes that are less efficient and resilient.

As best practices, ICPC recommends that states:

- Seek to ensure that the ISA Exploitation Regulations protect existing submarine cables and avoid foreclosing routes for future cables;
- Support amendment of the ISA Exploration Regulations to protect existing submarine cables and avoid foreclosing routes for future cables; and
- Seek to ensure that the BBNJ treaty accounts for the socio economic importance of submarine cables, recognize the benign environmental impact of submarine cables and their co-existence in existing MPAs in areas of jurisdiction, and recognizes submarine cables as a sustainable use of the oceans.

EXHIBIT B:

Strategic Analysis
Vol. 36, No. 3, May–June 2012, 375–383

Routledge
Taylor & Francis Group

Commentary

India's Critical Role in the Resilience of the Global Undersea Communications Cable Infrastructure

Ronald J. Rapp, Franz-Stefan Gady, Sarabjeet Singh Parmar and Karl Frederick Rauscher

Introduction

A secure maritime environment is vital to India's national security, the security of the South Asia region and, increasingly, to global economic stability. Powerful evidence for this, which is both timely and pointed, is the Global Undersea Communications Cable Infrastructure (GUCCI), connecting India to the rest of the world via cyberspace. This often overlooked critical international infrastructure underpins the internet, is responsible for financial transactions of the order of $10 trillion daily, and is tightly intertwined with India's ability to emerge as one of the world's few cyber superpowers. Private and public sector stakeholders are currently examining a critical aspect of India's role relating to the resilience of GUCCI: the timely repair of damaged cables. Specifically, focused efforts are underway to improve Indian processes for according approval to specialised cable repair ships to enter established maritime zones in order to perform cable repairs.[1] The goal is to ensure that India's process execution speed is within range of best-in-class standards. The important interests that must be addressed in this process encompass five distinct areas across a broad spectrum of concerns: national security; immigration; customs; economics; and safety and environmental concerns. The implementation of newly formulated and proven international best practices is crucial for effectively addressing each of these concerns. Because of India's critical role in the continued operation of multi-national software-based companies, outsourcing services and other aspects of the world's economy, it is imperative that India succeeds in this mission.

The importance of undersea cables to India's economy and security

In December 2008, multiple accidental cable cuts in the Mediterranean Sea and the Persian Gulf resulted in a widespread loss of internet connectivity throughout the Middle East and South Asia.[2] India lost 50 to 60 per cent of online connectivity while Egypt lost 70 per cent. In Pakistan, 12 million people were knocked offline suddenly

Franz-Stefan Gady is an Associate at the EastWest Institute, New York; Ronald J. Rapp is Director of Industry and Marine Liaison at TE SubCom, Morristown, New Jersey; Karl Frederick Rauscher is a Distinguished Fellow and Chief Technology Officer at the EastWest Institute, New York; Sarabjeet Singh Parmar is Research Fellow at IDSA, New Delhi. The views expressed are those of the authors.

ISSN 0970-0161 print/ISSN 1754-0054 online

http://dx.doi.org/10.1080/09700161.2012.670444
http://www.tandfonline.com

and in Saudi Arabia, 4.7 million were unable to connect to the internet. The impact was immediate and felt globally, as alternative routes were now required to handle extra traffic. As with other catastrophic infrastructure failures, it is difficult to capture the massive economic cost of such events, but it is quite clear that the costs are directly proportional to the event's duration.

Many consumers, businesses and governments incorrectly assume that their international communications are carried via satellite links.[3] As such, they may have a misplaced and false sense of security and may not appreciate the critical dependence on undersea communications cables. The fact that our global digital connectivity rests upon the reliability of fibre optic cables stretching across the bottom of the Atlantic, Pacific and Indian Oceans should be—but probably is not—widely considered in business planning, national security strategy and maritime policy.

The undersea cables landing in India and transiting its Territorial Sea (TS), Contiguous Zone (CZ), Continental Shelf (CS), and Exclusive Economic Zone (EEZ) carry 99 per cent of transcontinental financial transactions and data between India and other parts of the world.[4] All of India's major internet and telecommunications service providers are connected to the world primarily through undersea cable systems. The GUCCI interfaces to India comprise 13 different undersea cables landing in Chennai on the east coast (TIISCS, I2I, SMW4), Mumbai (SMW3, SMW4, EIG, IMEWE, SEACOM, Flag-Falcon, FLAG-FEA, GBI) and Cochin (SAFE, SMW3) on the west coast. Four new cables have been laid in the last two years (see Figure 1).

The stability of international information flows depends on the safety and security of these cables. The growing private sector bandwidth demand coupled with the concentration of undersea cables will increasingly affect the business continuity of multi-national corporations. This dependency will only increase in the years to come. Cable cuts are especially problematic for India's booming outsourcing industry since it is, like the financial sector, entirely dependent on uninterrupted connectivity to its

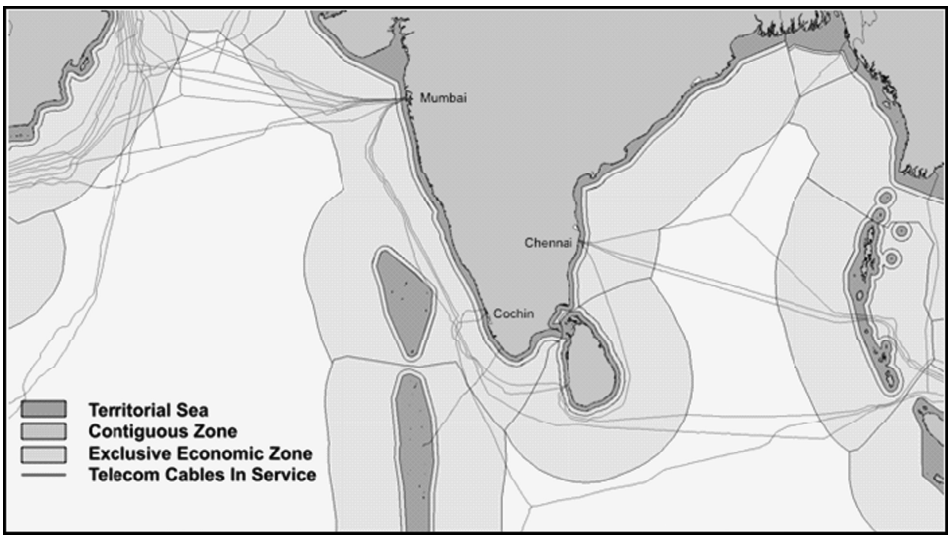


Figure 1. India's undersea cables and maritime zones.

Note: The authors recognise TE SubCom for the map. Marine boundaries provided by Global GIS Data Services, LLC 2011.

principal customers overseas. Disruptions usually occur due to the accidental contact of cables with ship anchors or fishing gear, and due to natural disasters such as underwater earthquakes.

Ensuring the reliability and resilience of undersea cables

While undersea cable routes are designed to mitigate risks and avoid cable breaks, it is not possible to completely eliminate this risk over the designed life of the system. Cable breaks are inevitable. Telecommunications companies have planned for these events by technical innovations such as ring and mesh networks, installing multiple interconnected cables and purchasing spare bandwidth on diverse cables used to restore network traffic. In addition, the cable owners and ship providers have developed a worldwide cable maintenance infrastructure and have implemented practices that rely on specialised ships and trained and qualified crew and joiners, as well as the provisioning of system spares in depots around the globe. Cable owners typically enter into a maintenance agreement that provides for these specialised cable ships to be stationed at strategic locations and they are dedicated to the repair of cables described in the agreement. As such, cable ship services are efficiently shared by many cable systems in a given geographic region.

When a fault occurs, traffic is normally restored by rerouting it to the spare capacity on another cable. Sometimes this is virtually instantaneous and sometimes it takes hours or even days. In this state, the networks are at greater risk of outages since the spare bandwidth is greatly reduced. If another path is not available, the affected countries suffer an immediate loss of bandwidth or connectivity. Timely repairs to undersea cables are critical so that full capacity can be restored to the networks to avoid further degradation and service interruptions in the event of a second fault. Network outages can have a major impact on the affected country's economy and reputation. Significantly, every international cable acts as a restoration path for other cables, so when one cable is out, the resilience of other cables is indirectly impacted. Because of this, the rapid repair of international cables is in everyone's interest.

Logistically, the repair vessel can load spare cable and get underway quickly to the repair site. Practices have been refined to the point where the mobilisation, transit, cable recovery, repair and return to port can usually be completed within two weeks. However, the lengthy and complex permission and approval process for vessels to operate in the maritime zones of some countries often extends the repair time by weeks or even months. During this time, the coastal state's international communication link is degraded and is at risk of further degradation or complete loss in the event of additional cable faults. This risk can and must be mitigated by streamlining and shortening the permission process in these countries.

The United Nations Convention on the Law of the Sea (UNCLOS), to which India is a party, specifically outlines the duties and responsibilities of states with respect to the protection of this crucial fabric of the global digital economy. Among other things, it recommends that coastal states impose criminal and civil penalties for intentional or negligent injury to cables (UNCLOS Article 113). It also provides for the freedom to lay, maintain and repair cables outside of a nation's 12 nautical mile territorial sea (UNCLOS Article 58) and, more importantly, it grants a special status to cable repair ships laying and repairing cables (UNCLOS Article 58). India's Maritime Zone Act of 1976 is consistent with the UNCLOS 1982 regarding special freedoms for the laying and maintenance of submarine cables. It is recognised that the need to rapidly repair

undersea cables must be balanced with the national security and other interests of India. We believe that not only is this possible, but it will strengthen India's overall security and economy.

India's maritime security interests

India's maritime security interests are often cited as one of the principal reasons for the lengthy review process for granting of permits for cable repair vessels.[5] The need is understandable; the Indian navy has to operate in both an increasingly important and an economically volatile environment. The growing regional tensions, in addition to India's rapid expansion of its own naval forces, are bound to increase volatility in the Indian Ocean in the decades to come.[6]

The important interests that must be addressed in this process include national security, immigration, customs, economics, and safety and environmental concerns. India's national security focus is primarily on terrorism within India's maritime zones. For example, the terrorist attacks on Mumbai in 2008 originated from the sea, with the terrorists, who were members of the Lashkar-e-Taiba and the Students Islamic Movement of India, embarking from Pakistan, landing in Mumbai and attacking multiple targets all over the city. In this aspect, identification of vessels remains a primary concern. Secondly, immigration is an increasing concern for Indian authorities, primarily due to the large influx of illegal immigrants, especially from Bangladesh. As a consequence, India has put in place stricter immigration laws which are affecting crews on ships entering India's TS. Thirdly, because of the increase in seaborne narco-trafficking from Myanmar and Thailand, most of which takes place via sea, customs checks have become an important activity. India and its maritime zones are a major transit point for this drugs trade. Fourthly, India has seen a substantial increase in sea traffic in its maritime zones due to its astounding economic growth rate over the last decade. Fifthly, India is largely concerned about vessel collisions and oil-related disasters, which could wreak havoc on the ecology in the maritime environment.

Some of these interests are outlined in India's Maritime Military Strategy document of 2007 promulgated by India's Integrated Headquarters of Ministry of Defence (navy).[7] At its core, the document emphasises the crucial importance of protecting the sea lines of communication passing through the Indian Ocean for India's economic growth. The Indian Ocean accounts for the transportation of the highest tonnage of goods worldwide, with approximately 100,000 ships crossing it annually, carrying one-third of bulk cargo traffic, half of the world's container shipments and two-thirds of the world's oil shipments.

India's maritime strategy identifies five key energy sea lanes and choke points, and 'choking any of them would cause disruption of seaborne trade, and uncontrolled volatility in oil and commodity prices, leading to upheaval in the global economy'. The document, however, does not mention the importance of undersea cables. Two of the five zones—the Suez Canal–Red Sea–Mandab Strait passage and the Strait of Malacca—are also crucial cable choke points where undersea cables converge and where, if they were cut, outages could have severe consequences.[8]

One of India's underlying security concerns that encompasses the five interests cited above, especially from a security point of view, is the identification of ships entering India's maritime zones, specifically the TS. The maritime strategy cautions that, 'identification at sea will continue to be the biggest hurdle'. India is working on various new 'foolproof methods, and cooperation with neighbours, use of human

intelligence, and technical intelligence and collation of inputs by units at sea will have to be merged to obtain an accurate picture of the maritime domain'.

The required vessel permits and inspections are intended to ensure the security of the coastal state, the safety of offshore assets such as oil platforms and other vessels, and the protection of the environment. The vessel and crew are also required to comply with the coastal state's immigration and customs laws.

While there is no argument regarding the needs and rights of the coastal state to require certain permits and inspections for repairs within its TS, we believe that it is possible to streamline and shorten the permit approval process without jeopardising national security, safety and environmental concerns. In the further-from-shore EEZ, where the security risk is lower, a simple vessel notification process for conducting submarine cable repairs appears to comply with India's Maritime Zone Act. In fact, a process improvement may often strengthen security, while also allowing the undersea cable infrastructure to be repaired in a timely manner. Since the undersea cables are also critical to the coastal state economy and security, a balance must be struck.

This initiative is summarised in ROGUCCI Recommendation No. 2:

> Nation-state governments should implement policies and procedures to provide timely approval to authorized cable ships seeking permission to repair damaged undersea communication cables.[9]

Addressing India's national interests—developing best practices for repair permits

The Indian government has recognised the criticality of a reliable undersea cable network to the Indian economy and security and has started a programme to review the process of granting permits to cable repair ships. The initiative was developed at a workshop held in New Delhi in April 2011, sponsored by the Federation of Indian Chambers of Commerce and Industry (FICCI) and the EastWest Institute (EWI) and attended by the Data Security Council of India, the Indian Department of Telecommunications, the Indian National Security Council and telecommunications companies in India that own undersea cables landing in India. The workshop was a timely one; it was scheduled just after an international conference of the International Cable Protection Committee (ICPC) held in Singapore. The ICPC joined hands with the Centre for International Law at the National University of Singapore (CIL/NUS) to collaborate to act on ROGUCCI Recommendation No. 2. The outcome of this meeting was the publication of a set of voluntary best practices that could be considered by coastal states, cable owners and ship operators to improve the situation regarding granting of repair vessel permits. India is now considering adopting this guidance in developing a set of their own India-specific best practices. The lead agency (Department of Telecommunications) has polled the telecommunications companies in India for their input on process improvements.

The key best practices resulting from the ICPC/CIL Singapore 2011 meetings are as follows.

Appoint lead agency. By appointing a lead agency to coordinate national policy and activities on undersea cables, all aspects and agencies involved in the application review, routing and approvals can be coordinated and monitored to ensure that the application is acted on in a coordinated and timely manner. This also benefits the

coastal state in that it ensures that the process is correctly followed, that conflicting requirements by various agencies are eliminated and that the vessel, equipment and crew meet all governmental requirements of national security, immigration, customs, economics and safety and environment and no agency is overlooked. Electronic routing and use of a database can expedite and reduce the cost of the review process. This will also increase efficiencies when vessels apply for renewals.

Full industry transparency. The vessel provider must do its part by providing all necessary information on the vessel, vessel equipment, crew, and operating zones and procedures in a timely and comprehensible fashion such that the government agencies can act efficiently and rapidly. A common application template would benefit both the vessel owner and the government agency. Daily reports provided by the vessel regarding its position would address the security concerns of relating 'identification' noted above. Cooperation during the permit application process ensures that the repair location does not conflict with existing military assets, that the vessel does not contain survey equipment that may detect sensitive infrastructure important for security, and that none of the crew are a security risk.

Institute pre-approvals. So that repair vessels can be underway quickly (five days is an initial target in India), it is imperative that all permits are in place prior to the time of a cable fault. New vessels entering a maintenance agreement that will be repairing cables within the TS of India should apply well in advance. The permit should be renewed annually. This will result in a predictable and orderly process that will not need to be repeated for each repair while also ensuring that a thorough review is conducted. Conducting the Ministry of Defence and Ministry of Home Affairs reviews and the naval inspections ahead of time will ensure that they are carried out systematically and thoroughly. The process of obtaining visas should also not be overly complicated or lengthy.

Exclusive Economic Zone process. India's Maritime Zone Act 1976 and international laws (UNCLOS 1982) define a 12 nm limit from the declared baseline as TS which is to be treated as part of a nation's sovereign territory. Subsequently, for any repair within the TS, all permissions and approvals to ensure the security and economics of the coastal state would apply and the repair vessel would be cleared through customs and immigration at an Indian port before conducting the repair. However, if the repair is being conducted outside of the TS, in the EEZ, there is no requirement for the vessel to clear customs at an Indian port; the vessel could sail directly to the cable fault, make the repair and then return to its home port, thus saving three to seven days in the process. In addition, most coastal states request only that a Notice to Mariners (NTM) be issued when working in the EEZ to note the location of the repair activity. In many coastal states, an NTM is all that is required even in the TS.

Specific recommendations to streamline procedures and secure national interests

Cable repairs in India are performed by two to four dedicated vessels currently under permission from the Ministry of Telecommunications, the Ministry of Defence, the Ministry of Home Affairs, the navy, the director general of shipping and local port control.

Cable owners continue to emphasise the need for faster permissions and clearances for repair vessels working in the TS, CZ, CS, and EEZ. Their experience has been that Ministry of Home Affairs and Ministry of Defence permits can be pre-approved, but repair vessels still require a director general shipping licence, naval clearance, and importation of the vessel (if working in the TS), all of which increase the time and expense of getting clearance for a vessel to conduct a repair.

Table 1 provides a summary of recommendations to be considered in order to improve the existing permitting process.

While the use of in-country vessels benefits the Indian economy, the INSA (Indian National Shipowners' Association) clearance must be balanced by the need to restore the telecommunications system, which has a much larger economic impact by comparison. Also, since cable repairs require a specialised vessel with specific equipment, it is unlikely that there will be an economic incentive to commit a local vessel to cable

Table 1. Summary of vessel permit recommendations for cable repairs.

Permit	Agency	Recommendation
RSEE Permit (Research, Survey, Exploration & Exploitation)	MoD and Integrated Headquarters of MoD (Navy)	• Consider eliminating this requirement since cable surveys are not considered research, exploration or exploitation. • Otherwise grant pre-approval and applicable to TS only. • Make valid for 1 year.
MHA Clearance (for all personnel/crew involved, or to be involved, in the project)	Ministry of Home Affairs (MHA)	• Grant pre-approval and make applicable to TS only. • Combine with visa application. • Use electronic national database. • Not tied to specific vessel. • Valid for 5 years.
Specified Period License (SPL) Prerequisite is MMD port clearance and Indian Registry of Ships (IRS)	Director General Shipping	• Grant pre-approval and make applicable to TS only. • Base approval on Classification Society Certificate which ensures safety to assets, personnel, and environment.
INSA Clearance	Indian National Shipowners Association (INSA)	• Remove requirement for specialised cable ships.
Naval Clearance	Flag Officer Offshore Defence Advisory Group (FODAG)	• Grant pre-approval and make applicable to TS only. • Conduct inspection in vessel home port if outside of India. The issue here is the feasibility of FODAG to undertake such an inspection and whether it be conducted by the embassy or high commission.
Crew Visa	Immigration Office	• Combine with MHA clearance in a national database.
Vessel Importation	Customs	• Eliminate importation requirement for cable repair ships due to critical nature of telecom repairs.

Table 2. Systematic coverage of India's five security interests by available international best practices.

Best Practice[a]	National Security	Immigration	Customs	Economy	Safety and Environment
Lead Coordinating Agency	Yes	Yes	Yes	Yes	Yes
Transparency of vessel details and crew	Major benefit	Major benefit	Yes	Yes	Major benefit
Pre-approvals with appropriate validity period	Yes	Yes	Yes	Major benefit	Yes
Repairs outside Territorial Sea with notification only	Yes	Yes	Yes	Major benefit	Yes

Note: [a]Recommendations distilled from the ICPC/CIL 2011 workshop in Singapore.

repairs alone without other business opportunities for the vessel due to the large investment required for the ship and equipment. Thirdly, as there is currently no cabotage legislation in India, this requirement should be re-evaluated in that light.[10]

Temporary vessel importation for work in the TS is perhaps the most onerous requirement for cable installation or cable repair, significantly adding to the time and cost of a cable repair operation. Currently, if the vessel is making the repair within the TS, the vessel and contents are temporarily imported into the country by posting a re-export bond that is 22 per cent of the vessel value (customs duty on goods). For a variety of reasons, the bond is often drawn down and only a portion is paid back to the importer of record. This results in a very costly repair and is a significant disincentive for making repairs to cables in Indian waters. The economic benefit of the customs duty is far offset by the economic loss of network outage throughout India. India must consider waiving this duty in view of the greater economic cost of telecommunications disruptions.

Table 2 demonstrates that the recommended permitting best practices address each of the five distinct security interests.

Conclusion

This commentary highlights the vital importance of reliable and secure undersea communications cables for India, the South Asia region and the world. The paper has examined each of India's five distinct security interests with regard to established maritime zones. Each of these five areas has been addressed systematically with best practices that, when implemented, have been proven in other countries to enable best-in-class performance for the timely authorisation of special cable repair ships to enter established maritime zones.

By considering the implementation of these key recommendations within the framework of India's maritime strategy, the Indian government can seize an opportunity to vastly improve the cable repair times and thus improve the availability of its international connectivity. These best practices are immediately actionable and are expected by industry experts to bring about a dramatic improvement in the authorisation process performance, reducing authorisation times from months to days. In addition, improved timeliness of repairs will also reduce the risk of catastrophic outages due to multiple faults. By streamlining what is now a lengthy and complex process for obtaining cable repair ship permits, India will benefit in many ways.

As India seeks to fulfil its vision to achieve her full potential for maritime security, it is essential that its maritime strategy also include the new priority for the protection and care of undersea cables. India needs a complete strategy in keeping with its rising stature and reputation in the arena of human capital, technology and economy.

> India is a developing country; 'tomorrow' is expected to be better than our 'today'. We are yet to build up or achieve our full potential. In the coming decade India can be expected to establish herself as an acknowledged maritime power capable of exercising strategic maritime influence.
>
> – *Freedom to Use the Seas:* India's Maritime Military Strategy (2007)

Notes

1. We define maritime zones to include those defined under India's Maritime Zone Act of 1976 and the UN Convention on the Law of the Sea (1982) as Territorial Sea (TS), Contiguous Zone (CZ), Exclusive Economic Zone (EEZ), and Continental Shelf (CS).
2. Karl Frederick Rauscher, *Reliability of Global Undersea Communications Cable Infrastructure (ROGUCCI), The Report*, 2010, Appendix A.3, 'Intrinsic Vulnerability Analysis of Select Recent Events' and Appendix C, 'Impact of Historic Outages', at www.ieee-rogucci.org.
3. Satellites cannot meet the bandwidth or latency requirements of modern telecommunications networks. ROGUCCI Key Observation No. 23, *Alternatives Are Not Up in the Air*.
4. ROGUCCI Key Observation No. 22, *99+%.* Nearly all long haul intercontinental communications traffic is carried through undersea communications cables. Less than 1% of intercontinental traffic is carried via satellites. *EWI Launches New Delhi Summit Process; India Pushes Cybersecurity Ccooperation*, at www.ewi.info/ewi-launches-new-delhi-summit-process-india-pushes-cybersecurity-cooperation.
5. The procedure for a repair vessel to obtain approval for entering waters to restore service in some countries is very complex and can introduce significant delays to the repair procedure. Equipment supplier-provided data showed two modes of repair for faults and outages. One mode had a dramatically longer duration, which was due to extended permitting procedures. It appears that for some countries the process can vary and suggests a gross lack of planning and coordination on the part of the government. ROGUCCI Key Observation No. 79, *Paperwork.* The Ministry of Home Affairs requires a background check on each crew member and specialist on a cable repair ship, a process that can take over four months. In addition, the Ministry of Defence requires a permit for the vessel and equipment. The delays associated with lengthy authorisation processes from the Indian government are cited as often lasting more than 10 weeks. Best-in-class performance is on the order of only several days (e.g., Australian government).
6. Cdr. P.K. Ghosh, *Maritime Security Challenges in South Asia and the Indian Ocean: Response Strategies*. Center for Strategic and International Studies–American Pacific Sealanes Security Institute Conference on Maritime Security in Asia, January 18–20, Honolulu, Hawaii, at http://community.middlebury.edu/~scs/docs/ghosh%20maritime%20security%20challenges%20in%20SAsia%20&%20Indian%20Ocean.pdf (Accessed March 29, 2012).
7. *Freedom to Use the Seas: India's Maritime Military Strategy*, at http://indiannavy.nic.in/maritime_strat.pdf.
8. ROGUCCI Recommendation No. 1, *Rudimentary Geographic Diversity for Global Infrastructure*, ROGUCCI Report, p. 102.
9. Ibid., Recommendation No. 2, p. 106.
10. Some countries have enacted cabotage legislation to require the use of a vessel that is registered and flagged in the host country when working within its maritime zones.