A submarine cable fouled by a ship's anchor

Under the sea

Submarine cables 'anchor' the internet, but a ship's anchor in a cable exposes a shipowner to significant but avoidable risk, says **Dean Veverka**

While shipowners may rely on satellites for communications with their vessels at sea, transoceanic telecommunications (including the internet) are now almost totally dependent upon fibre-optic submarine cables, which are now recognised as critical infrastructure by many governments.

Since the first transoceanic, fibre-optic cable was laid in 1988 the world has undergone a communications revolution: click the SEND button on an email to an overseas shipping office and there is almost a 100 per cent probability that the message will pass through one or more submarine cables. Voice, data and internet connections used for commerce, finance, education, entertainment and emergencies are also heavily dependent upon cables. For example, one major international bank has an average of $3.9 trillion dollars of transactions taking place over the submarine cable network on a single working day.

This economic and social reliance is emphasised when cables are disrupted as was the case on 26th December, 2006. A magnitude 7.0 earthquake off southern Taiwan triggered submarine landslides and mud flows that travelled over 245km across the deep ocean floor, causing 22 cable breaks en route. Communications, data and internet traffic were extensively disrupted. Despite emergency restoration measures via intact cables, internet speeds were slow for the next seven weeks as 11 cable ships worked to repair the damage. The overall impact was substantial.

Although the Taiwan earthquake was a major event, such hazards are not the main cause of cable faults. Records extending back to 1959 reveal that fishing and shipping activities account for at least 60 per cent of all cable faults whereas natural hazards

cause less than ten per cent. Recently, due to the increasing use of Automatic Identification System (AIS) technology in some regions, cable faults caused by vessel anchors and fishing gear has been evaluated at 77 per cent of all faults.

Various modes of fishing involving placement of heavy gear on the seabed result in 50 to 100 faults a year, typically in water depths shallower than 1500m, a common depth limit for bottom trawl fisheries. In contrast, the main threat posed by shipping is anchoring and so the 'danger zone' for cables is on the continental shelf in depths less than 200m.

With so much at stake, the cable industry, in consultation with other marine industries and governments, undertakes a range of measures to protect this critical infrastructure. Positions of submarine cables are reported to national charting authorities so that their presence on navigation charts is visible to all mariners.

It is customary in the submarine cable industry to maintain toll-free telephone access on a 24/7 year-round basis so that vessel masters and owners can report when cables are fouled on anchors or other ship's gear. If fouling occurs, international law requires it to be sacrificed to avoid damage to the cable. When a vessel sacrifices its anchor or gear to prevent injury to a cable, international law obligates the cable owner to indemnify the vessel for the cost of the sacrificed anchor or gear, providing the cable was not fouled in the first place by the vessel's negligence. The policy behind this legal requirement is that disruption to international communications is to be avoided and has priority over the replacement of sacrificed anchors or gear. International law also requires nations to implement the provisions of the United Nations Law of the Sea Convention (1982) by establishing domestic criminal and civil law penalties upon those who damage submarine cables wilfully or by culpable negligence. These measures all contribute to reducing avoidable cable faults.

The cost of repairing a submarine cable averages between $1 million to $3 million. Repairs involve specialised cable ships with highly trained crews that cost tens of thousands of dollars per day in addition to the replacement costs of damaged cables and other consumables. According to one survey, the historical average repair period is 20.6 days. Additionally, in some cases, further costs arise because of the need to reroute and restore communications using unaffected cable systems. These restoration costs can exceed the actual repair costs!

When cables are damaged, the vessel owner and its underwriter can expect a claim brought against the vessel in an admiralty court. With AIS, the problem of identifying the vessel that caused the damage has been greatly simplified. Liability under the general maritime law for cable damage by vessels is normally straightforward since the vessel is expected to avoid cables that appear on charts or are otherwise known actually or constructively to the master.

The use of AIS has also been useful in highlighting aspects of anchor damage that can easily be prevented. There have been 53 cable faults around the UK between 2007 and 2010, of which 19 were caused by anchors. Analysis of AIS data and subsequent investigation and claim recoveries determined that 13 of the faults involved vessels that did not properly secure their anchors for sea with the use of a chain stopper, pawl, or other mechanical device. Instead, only the hand brake on the anchor windlass was used. In the course of sea passage, a brake can loosen and an anchor deployed, frequently with the watch unaware that the anchor was dragging. Another incident off Sicily in 2008 involved a single 58,000 ton tanker that dragged its anchor over 300km and damaged six international cables in water depths down to 180m. The common error in these cases was a decision by the crew not to secure the anchor for sea, possibly because the passage was considered coastal, there was crew shortage, a desire to avoid paying overtime, or pure negligence. But regardless of the reason, ineffective anchor stowage is not the action of a prudent seaman. The damages to the cables are all violations of international law and are examples of bad seamanship, in addition to being violations of domestic criminal or civil maritime law.

As responsible users of the sea, vessel owners, their underwriters, and crews should comply with the basic seamanship obligation and implement procedures to positively confirm that the ship's anchor is secured for sea with the mechanical devices for that purpose carried by the vessel. The International Maritime Organisation (IMO) is also encouraged to review this significant and avoidable threat to international communications to determine if changes in vessel equipment or manning and training standards can be improved. The importance of reducing such easily preventable damage to the world's critical infrastructure fully justifies such measures by all concerned with vessel operations. ❖

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Dean Veverka is the chairman of the ICPC. The International Cable Protection Committee (ICPC) is a non-profit organisation that encourages co-operation with other users of the seabed and facilitates the exchange of technical, legal and environmental information concerning submarine cable installation, maintenance and protection. It has 125 members representing telecommunications and power cable companies, government departments, cableship operators, marine survey companies and scientific organisations from over 60 countries.
For more information, visit www.iscpc.org.