Why do marine fiber optic cables continuously break? How to repair fiber optic cable?

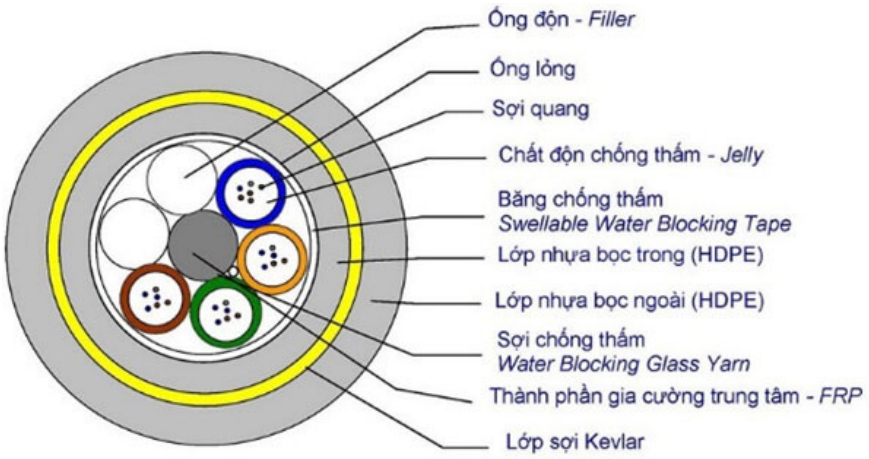
Having problems with undersea fiber optic cables is no longer a strange thing to users. Sometimes, there are even 2 or 3 fiber optic cable lines having problems at the same time. The problem on this cable line has not been resolved yet, the other cable line continues to break.

This makes many people wonder why the fiber optic cable goes through many countries and lies deep under the sea, but why is it constantly broken and how the repair process takes so long. We invite you to find out the answer through the article below.

Why do marine fiber optic cables keep breaking?

In fact, problems with undersea fiber optic cables are not uncommon and some areas will have a higher frequency of fiber optic cable breaks than other areas.

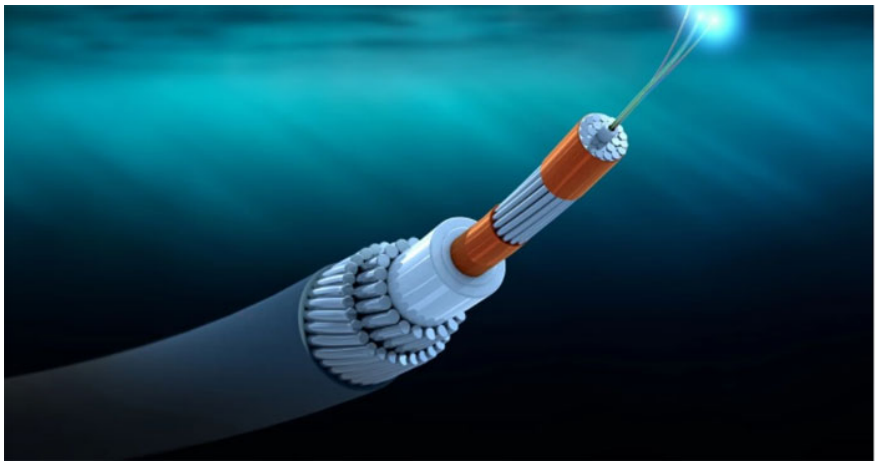
To find out the cause, we will first learn about the structure of undersea fiber optic cables.



If you think that undersea fiber optic cables must be placed in a carefully covered underground pipe system, you are wrong. Undersea fiber optic cables have a length of up to tens of thousands of kilometers, so they are designed with the principle of reinforcement near shore and are very fragile offshore.

In fact, submarine cables are often just wires laid bare on the sand under the sea. Near shore, new submarine fiber optic cables are reinforced with steel braid and other reinforcing layers. The reason is that near the shore, the water level is shallow and there are many maritime activities, leading to the possibility that a ship's anchor or a seabed trawl will hook on the cable line, causing high damage.

Even though the marine fiber optic cable near the shore is more reinforced, it is still very easy to break if it is hooked and dragged by the anchor of a cargo ship of several tens of thousands of tons.



70% of fiber optic cable breaks at sea are caused by ship anchors and human fishing activities. This explains why cable breaks only occur in certain water areas.

The water level in Vietnam's East Sea (especially the Vung Tau area, where the AAG cable line lands on the mainland) is relatively shallow. Meanwhile, ship activity around this area is very large. Therefore, these are sea areas where submarine cables are easily broken due to ship's anchors.

The remaining 30% of cable breaks are divided equally into the following causes:

1. Intentional destruction by humans.
2. Due to natural disasters such as earthquakes, underground volcanoes, mud slides, and thunderstorms.

Many countries have tried to overcome the frequent breakage of undersea fiber optic cables using many different measures, but all have been ineffective. The most effective solution at present is still to cut and then connect.

It is impossible to limit problems with undersea cable lines, but we can limit their impact on Internet service quality in a number of ways such as using many different transmission channels, not concentrating traffic on one channel. , 2 large channels and almost exhausted the reserved bandwidth, then wait for the cable to break and have to increase the bandwidth/real connection capacity ratio.

How to repair fiber optic cable? Why does it take so long to repair fiber optic cable?

Fiber optic cables stretch across many countries and lie deep under the sea, possibly even at a depth greater than Mount Everest. Therefore, repairing undersea fiber optic cables is difficult and time-consuming.

The first step is to find the location of the damage. When sent through the cable, a pulse of light travels all the way to the other side. But when the cable breaks, the broken segment reflects the light pulse back. Based on the time the pulse returns, engineers can find the location of the break.

The second step is to send a ship to make repairs. The repair ship takes about 3-5 days to reach the damaged cable location. Previously, the contractor also had to spend time waiting for a license to be able to travel through many different sea areas.

The damaged fiber optic cable will be pulled up from the seabed, the damaged part removed and a new cable connected. Cable repair requires the ship to maintain the same position on the sea surface throughout the repair period, but weather conditions at sea are not always favorable. Before being lowered back into the sea, the cable will be thoroughly inspected.

It sounds simple, but each of these steps takes a lot of time. According to reports about fiber optic cable repairs, depending on the factors of the cable location and the level of damage, the repair time can last from several weeks to several months.

Difference in the number of undersea fiber optic cables

There is a large difference in the number of undersea fiber optic cables between countries around the world. Developed countries have large undersea fiber optic cable systems such as the US (91), UK (54), and Japan (26). Meanwhile, many other countries around the world only have a single cable line to connect to the Internet, or two if you're lucky.

According to TechRadar Pro statistics in August 2020, there are 19 countries, accounting for 10% of countries globally, supported by only a single undersea fiber optic cable. Including countries with large populations such as Azerbaijan, Kazakhstan, Sierra Leone.

There are 11 countries in the world with a total number of nearly 450 million users using two undersea fiber optic cables.

In these countries, if a problem occurs, the Internet connection will be interrupted.

The number of undersea fiber optic cables in Vietnam is 7, with a population of more than 97 million people, more than 68 million Internet users. That means an average of 14 million people per cable line, low compared to other countries in the region and the world.

Meanwhile, Thailand has 10 cable lines for 69.8 million people, Malaysia has 22 cable lines for 32.3 million people, and Singapore has 30 cable lines for 5.85 million people.

7 cable lines connecting to Vietnam include SMW3, AAG, IA, APG, AAE-1, SJC2, ADC. The SMW3 route has been in operation since 1999 and is about to be liquidated, while the other two routes, AAG and IA, have also been in operation since 2009, for 12 years. Vietnam's undersea fiber optic cables have broken on average 10 times per year over the past 5 years.