

U.S.-CHINA ECONOMIC AND SECURITY REVIEW COMMISSION
“Part of Your World:
U.S.-China Competition Under the Sea”
Vice Admiral Richard Seif, Commander, Naval Submarine Forces
Rear Admiral Mike Brookes, Commander, Office of Naval Intelligence
United States Navy

Question submitted by Vice Chairman Michael Kuiken

1. In your oral testimony, you said 200 cables are cut each year. Can you give us your assessment of what global capacity is to repair cables, how long it takes to repair them, and how those repairs work?

Rear Admiral Mike Brookes:

Response:

Global Repair Capacity:

There are approximately 65 cable ships globally focused on fiber-optic communication cables. Of these vessels, approximately 20 are primarily assigned to cable repair duties and strategically positioned around the world. Undersea cable repairs rely upon this small global fleet of specialized vessels equipped with spare cable, jointing equipment, specialized technicians, and dynamic positioning systems to remain stationary over a repair site. A 2025 industry study determined 20 new cable ships at an estimated cost of \$3B are needed globally by 2040 to replace retiring ships while adding five cable ships to address the forecasted increase in outages stemming from continued growth in the sector. At least six new construction cable ships are currently on order globally.

How Long Repairs Take:

In 2024, it took on average 51 days for a repair to be conducted. Many factors influence the time it takes for a cable repair ship to arrive at the site, and the duration of a repair. These include: waiting for maritime work permit approval, ship availability, weather conditions, the depth of the cable, distance from the repair ship, and other factors. Repairs in waters shallower than 1,500 meters are typically conducted using a Remotely Operated Vehicle (ROV) to retrieve the damaged cable from the seafloor and generally take 1 – 3 days once the cable ship arrives onsite. Repairs in deep waters generally take a week or more and employ grapnels to bring the cable to the surface for repair.

How Repairs are Conducted:

Repairs are contracted via three models: consortium zones, where cable owners within a region pool resources to maintain repair vessels on standby; private zones where cable owners fund vessels for their systems independently; or ad hoc. If more than one cable is damaged within a contracted area simultaneously, prioritization occurs largely by the impact on traffic and network redundancy, and the availability of maritime work permit approvals. The site of repairs is determined by onshore terminal station testing which sends light pulses down the fiber paths and

measures the time it takes for reflections to return, indicating the damage location. Alternatively, systems power readings can locate a general damage area. Once the cable vessel arrives onsite, it retrieves the cable from the seafloor using an ROV or grapnel. The damaged section of the cable is removed and a new section is spliced in to replace the damaged portion. The individual hair-thin glass fibers within the cable are carefully stripped, cleaned, and fused together with a fusion splicer. This machine precisely aligns the fibers and uses an electric arc to melt and join them, creating a seamless connection. After the fibers are spliced, the cable joint is sealed in a protective, waterproof casing. The repaired section is then tested to ensure a strong and clear signal before the cable is lowered back to the seafloor using tensioners to control the rate of descent. Post-repair inspection and burial occur in areas susceptible to further damage, where the cable is buried utilizing a ROV with high-pressure water jets.