Subsea communication cables: Lessons from the past

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On 23 August 1850, the first telegraph cable between Dover, United Kingdom and Calais, France was successfully laid with, "the weather proving so propitious that one might imagine all Nature approved of the undertaking." The very next day, it appeared that the cable had faulted near the French coast and earlier attempts to telegraph communication had not, in fact, been successful. The cause of the fault was indeterminate despite newspaper reports attributing damage to a French fisherman who had cut the cable to free his lines. These reports never found strong substantiation and may have stemmed from a single source – William H. Russell's book, *The Atlantic Telegraph*, published in 1865 – that not only embellished the story but also lacked any reference for it. This apocryphal narrative was contradicted by other reports of the rupture having been due to natural factors: exposure of unarmoured cable to sharp rocks and sea swells. The cable's fragility is noteworthy: it comprised only a single No. 14 copper wire insulated with *gutta percha*, discussed below.

Lesson #1: Safeguarding the physical resilience of cables

This event, nearly 200 years ago, continues to bear important lessons for the resilience of submarine cables ("cables") to this day in at least three ways First, the materiality of technology, often lost in present day euphemisms like, "the cloud", means that digital connectivity can only be ensured when its physical infrastructure – cables, in this case – is adequately protected. This was true in the nineteenth century when electrical signals coursed through telegraph cables as it is today with fibre optic cables refracting light pulses encoded with electronic data.

With cables now accounting for over 99 percent of data transmission worldwide, ensuring the *physical* integrity of these cables is paramount for the digitised realities of modern life – from public administration to commerce, education to healthcare. The COVID-19 pandemic sharpened into focus the criticality of remaining virtually connected when physical borders close.

In Southeast Asia, the number and sophistication of cables is expected to rise to replace older ones and to meet mounting bandwidth demand. After all, this is a region where growth and digitalisation agendas are increasingly inextricable and consumer trends towards mobile-first data usage are underwritten by a flood of content and cloud solutions.

But Southeast Asia's geography and geology also makes it highly susceptible to accidental, natural, and induced cable faults. The region is flanked by some of the world's busiest shipping lanes including the Strait of Malacca, which links the Indian and Pacific Oceans, and the South China Sea. Unsurprisingly, therefore, the passage of tens of thousands of fishing, container, patrol, and other vessels annually through these waters means a higher propensity for cable damage from anchor drops and bottom trawling. Data from the International Cable Protection Committee (ICPC) shows that the primary cause (70 to 80 percent) of cable damage globally is due to commercial fishing activities and ship anchors. The remaining causes of damage are typically by abrasion, equipment failure, and natural hazards.

In Southeast Asia, Indonesia, the Philippines, and Timor-Leste sit within the Pacific Ring of Fire, a zone of intense geological forces that account for 75 percent of the world's active volcanoes and 90 percent of global earthquakes. The movement of tectonic plates and their aftershocks can mobilise powerful sediment flows resulting in multiple cable breaks. This was the case in December 2006 when two magnitude-7 earthquakes off the coast of southwest Taiwan damaged several cables affecting Malaysia, Singapore, and Thailand.

Additionally, subsea cables in the region are susceptible to human activities like sand dredging as well as deep sea mining. These activities not only dislocate natural seabed topography but contribute to coastal erosion thus rendering cables even more prone to damage as they surface close to their landing points.

Ensuring that cables are physically protected from natural, accidental, and induced faults requires a combination of policy foresight, regulatory flexibility, and sustained multi-stakeholder engagement. Involving a range of stakeholders beyond the enduring pairing of public-private coordination takes on particular import as the region experiences increasingly severe weather patterns. This stark change in reality necessitates expertise from other sectors such as climate science.

Although the Philippines experiences more tropical cyclones than anywhere else in the world, the intensifying climate crisis is resulting in harsher typhoons that can impact the seabed. A greater volume of rainfall and aggressive storm waves can trigger heavy sediment flows from land into the ocean with consequential damage to cables, as happened with Typhoon Morakot in 2009. But continuing coastal erosion and rising sea levels can also pose a challenge to the resilience of cable landing points not to mention the impact of extreme weather changes on local communities, including those who help maintain cable landing stations or the power grids that electrify them.

The Association of Southeast Asian Nations (ASEAN) is aware of these cable vulnerabilities. Its 2019 Guidelines for Strengthening Resilience and Repair of Submarine Cables is being updated for release in early 2026. Although voluntary in nature and constrained by incomplete maritime delimitation processes as well as disputed claims of maritime rights and jurisdiction, the Guidelines reflect international best practices such as those outlined by the ICPC. Referring to the efforts of the ASEAN Working Group on Submarine Cables to enhance the Guidelines, the 2025 ASEAN Digital Ministers Meeting underscored the importance of facilitating, "the expeditious repair, maintenance, removal, and protection of submarine cables."

Yet, policy makers should broaden their conventional scope of engaging with just industry to include environmental scientists, local community leaders, and grassroots activists. These stakeholders should be regularly consulted for a more holistic approach to protecting cable resilience, especially with growing recognition within the cables industry itself of its impact on marine biodiversity and the ecology. The ICPC played a key role in the passage of the Biodiversity Beyond National Jurisdiction (BBNJ) agreement under the United Nations Convention on the Law of the Sea. Policy makers could therefore consider harmonising ground, national, and industry perspectives on this issue in pursuing more comprehensive strategies at the regional and international levels.

Lesson #2: Refrain from jumping to conclusions

Second, in the event of a cable fault, priority should be focused on the repair and resumption of service rather than on speculation of intent. This lesson was true in the 1800s when imperial contestation was on the uptrend. It remains relevant today, amid geopolitical suspicions of state-sponsored sabotage in and around strategic waterways such as the Baltic Sea, Taiwan Strait, and the South China Sea.

Despite the almost doubling of cable length in the past 10 years, from 1 million kilometres in 2014 to 1.7 million kilometres in 2025, the number of faults has held between 150 and 200 incidents per year. This averages to two to four faults per week with most faults resulting from, "external aggression", that is damage caused by external forces other than technical fault. Despite the sensationalist terminology, these external forces instead refer prosaically to fishing equipment, anchoring, or natural disasters.

For the cable industry, maintenance and repair remain a key objective regardless of the cause of damage even though sabotage remains a (statistically, tiny) risk. Presuming intent or parties behind a fault is operationally unhelpful. But it can also be damaging to repair efforts if political positions harden and access to waters surrounding the affected cable(s) is denied. Further, attributing intent to damage is extremely difficult – it requires a high degree of confidence resulting from thorough technical investigation, which itself can take a long time. Even if technical attribution can be determinative, political attribution would require careful calculation of national interest considerations. Legal consequences may follow but as recent cases such as the Eagle S and Newnew Polar Bear have shown, proving deliberate damage or even jurisdiction may not be easy or quick.

Lesson #3: Advancing strategic resilience

Third, the notion of cables resilience should extend to the strategic ability of states to own, administer, and govern this infrastructure in their best national interests. Because cables are a vital communication asset that swell in significance amid geopolitical rivalry, Southeast Asia is increasingly being subjected to major power pressures to choose vendors that ultimately align with external agendas. Regional stakeholders that were previously accustomed to predominantly commercial calculations when planning cable routes, linkages, and landing points are now being confronted with discomfiting decisions as cable ownership, construction, and routes are filtered through the national security lens of distant capitals; in particular, Washington.

Recent reports of the United States' campaign to dissuade Southeast Asian countries like Vietnam from contracting Chinese cable suppliers, in fact, dates back decades. The October 2003 purchase by the Singaporean-owned ST Telemedia (STT) of the US firm Global Crossing, a multinational telecommunications provider, which filed for bankruptcy was only approved by the US Federal Communications Commission (FCC) after US national security concerns were deemed to be sufficiently addressed. Safeguards included the establishment of a network operations centre that could be accessed by US officials with a 30-minute notice and a security committee comprising US citizens with security clearance as part of a restructured board.

In July 2025, as part of the FCC's first major update of its cable rules since 2001 and recognising that, "economic security is national security", the commission instituted a "presumption of denial" for cable licenses and operations linked to US foreign adversaries. There has also been a series of legislative efforts within the US Congress to deny Washington's adversaries "items required for supporting undersea cables consistent with [US] policy". These and other similar measures have already been impacting Southeast Asia though not always negatively.

Indonesia, the Philippines, and Vietnam, for example, will benefit from route diversification away from the South China Sea and landing points in Hong Kong or mainland China. The Bifrost cable system, a joint venture between Meta, Keppel, Telin, and Amazon that came online in October 2025, is the world's first subsea cable system directly connecting Singapore to the US west coast via Indonesia through the Java and Celebes seas rather than the typically more direct and economical route through the South China Sea. Google's and Meta's Apricot cable system that connects Singapore to Japan will traverse Guam, Indonesia, the Philippines, and Taiwan, bypassing the South China Sea and the earthquake-prone Luzon Strait and Bashi Channel.

But cable systems that connect with or land in the United States are also subjected to US national security review and in instances like the Pacific Cable Light Network system, national security agreements between Google and Meta as the cable owners and the United States government to protect the data of US persons (but not necessarily that of other nationals).

Additionally, the changing structure of cable ownership and financing raises questions about strategic resilience for Southeast Asian nations. Amazon Web Services (AWS) is already invested in 9 million kilometers of terrestrial and subsea cabling – "enough to reach from Earth to the Moon and back more than 11 times" – while Meta's Project Waterworth cable system will span over 50,000 km (longer than the earth's circumference) and five major continents, when completed.

Between 2020 and 2024, hyperscalers accounted for 25.64 percent of a total 78 cable systems. Their year-on-year growth in driving cable systems is even more telling: 3 projects in 2021, 7 in 2022, 11 in 2023, and 13 in 2024. Hyperscalers are also increasingly leading the funding and technical design of cable systems, including routes and landing points that connect to their data centre locations.

While regional countries celebrate billion dollar investments by Big Tech, this dominance of the data-driven tech stack from cables to data centres and cloud to content risks leaving the region's digital infrastructure exposed to corporate capture with little public accountability. The converging agendas between US Big Tech and Washington should give further cause for disquiet among countries already reticent about being caught in the crosshairs of US-China contestation and technological fragmentation.

Conclusion: The ghosts of cables past

On 23 October 1856, the Dutch colonial administration of Indonesia connected Batavia (now, Jakarta) to Buitenzorg (Bogor) with the region's first telegraph line. Three years later, the Dutch more ambitiously commissioned the laying of a cable between Batavia and Singapore. That cable failed after only a few days due to a technical misstep but these early attempts marked the start of European powers connecting the region for their imperial pursuits. In 1870, Singapore's baptism as a cable hub became official as the British linked the port city to London's other strait settlement, Penang, which itself connected to Madras (now, Chennai). This route formed part of the British All Red Line telegraph network which strung together the core and periphery of the British empire. Even though cables connected cities across land and sea, they served the singular purpose of advancing imperial control through division and dominion. This cautionary reminder from centuries past casts a long shadow today as power plays splinter the global tech landscape and Southeast Asia grapples with the fallout.

History offers another valuable lesson for the strategic resilience of regional countries in the digital age. Most of the nineteenth century cables were insulated with *gutta percha,* which was resin from rubber-producing trees native to Southeast Asia. "Gutta" is in fact a variation of, "getah" which is the Malay word for rubber. Due to its thermoplastic qualities, *gutta percha* was used as a sealant for hundreds and thousands of kilometers of terrestrial and submarine telegraph cables for 80 years from when it was first introduced in Britain in 1843. The low yield of *gutta percha* per tree and untenably high demand for it came at great cost to the region, as "profligate, inefficient, and ultimately unsustainable methods of extraction" led to what the historian, John Tully, labelled, "A Victorian ecological disaster" in Malaysia, Indonesia, and Singapore.

Today, as Southeast Asia weighs its place in the expanding network of subsea fibre optic cables worldwide for the next few decades, it should recall its central role in linking the world two hundred years ago at the expense of its agency, independence, and sovereignty. Policy makers would do well to consider that the price of connection now simply cannot be subordination or subjugation all over again.