

# **Protecting & Expanding Submarine Cables**

**Mark Tinka**  
**Managing Director, TransmissionCo**



**TransmissionCo**

INFINITE WAVES

## Cable Failures

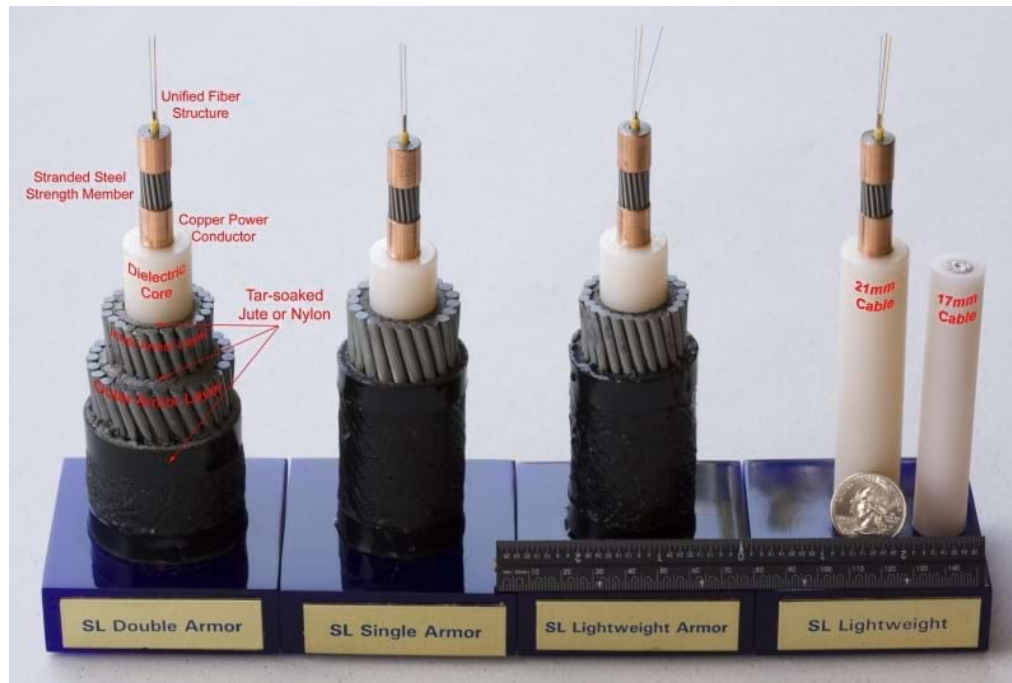


Source: Conqueror Freight Network

- There are places subsea cables don't want to go.
- 80% of cable faults are due to external aggression, i.e., fishing and anchoring.
- We have no concrete evidence of deliberate sabotage on subsea cables, bar a very small handful.



## Cable Resilience Improvement



Source: HomeMadeTools.net

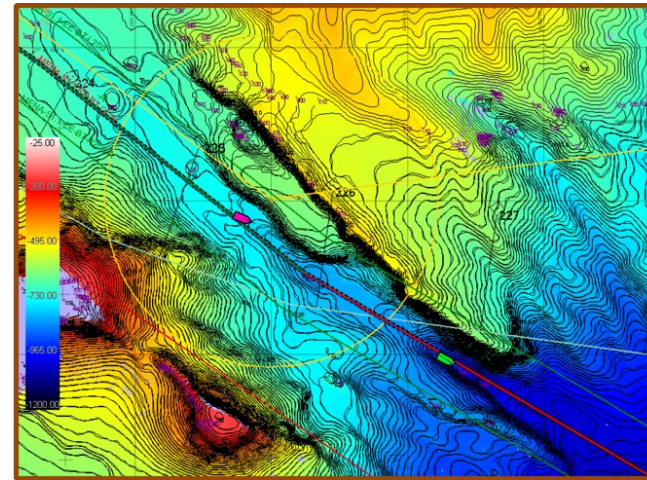
- Cable protection is the first tool in the box.
- Depth, terrain and human activity will determine the required level of protection.



## Cable Resilience Improvement



Source: Kentik



Source: Hydro International

- A good route survey and speaking to the local population about faults is very helpful.
- Routing around natural fault lines following an outage helps to protect from future intrusion.



## What About Security Patrol?



Source: Wikipedia

- Most subsea cables are private.
- Some operators invest in security patrol for critical routes. Small minority.
- More success in coordinating with ships in the area, but small fishing trawlers are especially problematic.
- Legislation as a resolution can be lengthy and often fruitless. Insurance is better.



## The Subsea Cable Business Is “Slow”



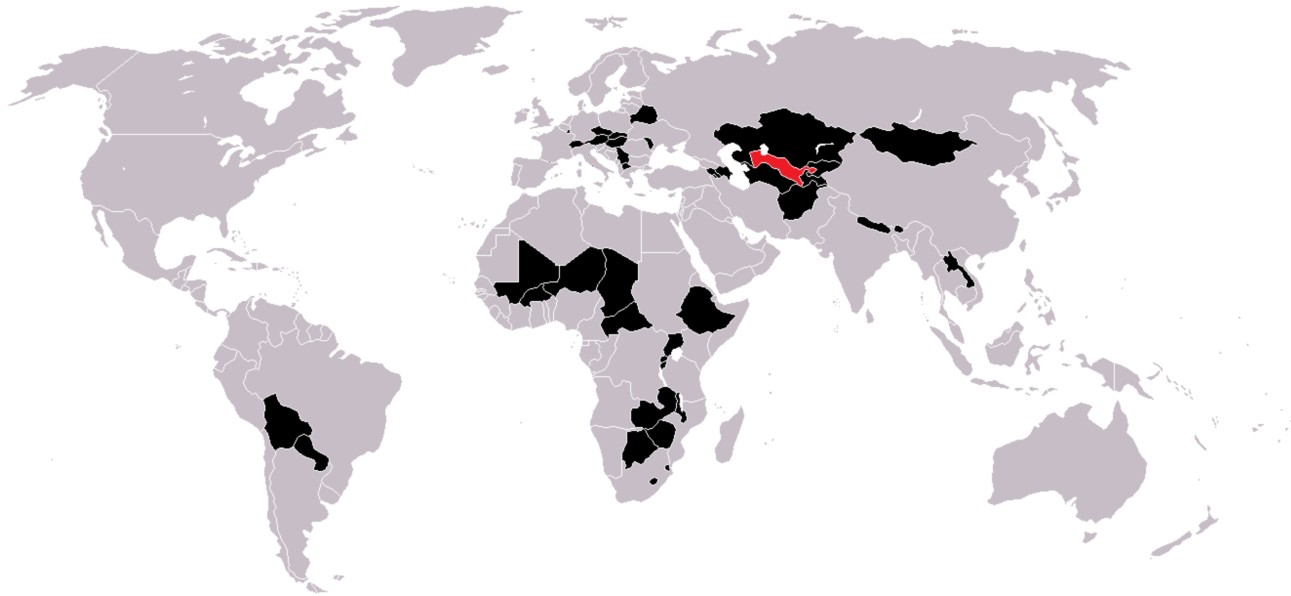
Source: National Maritime Foundation

- Repair vessels can usually take several weeks to repair a cable fault.
- Cost can be about US\$100,000 per day.
- Sea weather conditions often contribute to delays.
- There are only a handful of repair vessels in the world (~60).



## Impact To Landlocked Countries

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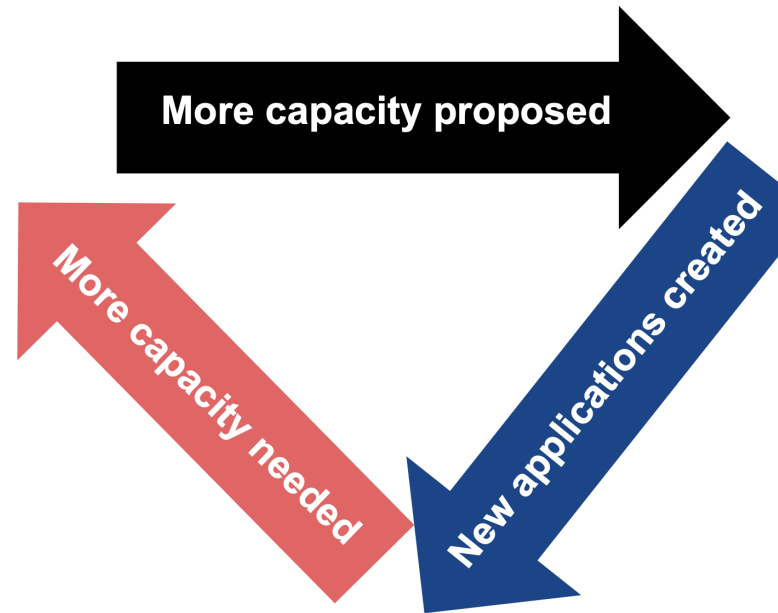
Source: DE Academic

- Africa has 16, Europe 14, Asia 12 and South America 2.
- Subsea outages cut off these countries, often with no reasonable alternative.
- Ultimate solution is terrestrial alternatives through other neighboring countries.



## Future Of Subsea Cable Capacity

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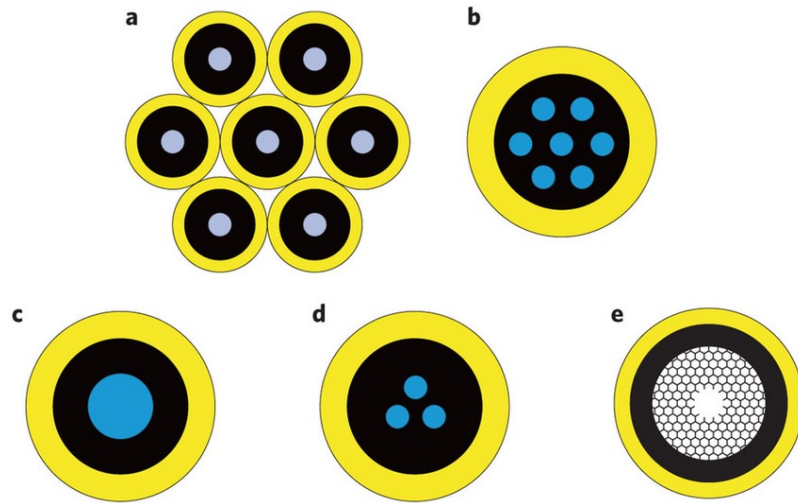
- Capacity availability is fueled by demand.
- Demand is fueled by available capacity.
- This trend will not stop.



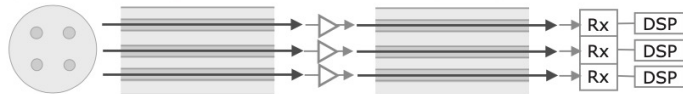


# Future Of Subsea Cable Capacity

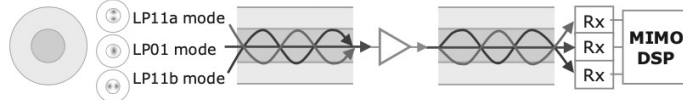
## Novel Fibres



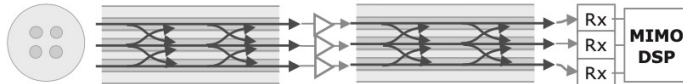
**(Uncoupled) Multi-core fiber (MCF)**



**Few-mode fiber (FMF)**



**Coupled multi-core fiber (C-MCF)**



- a) Standard SMF.
- b) MCF (uncoupled).
- c) FMF.
- d) C-MCF.
- e) HCF.

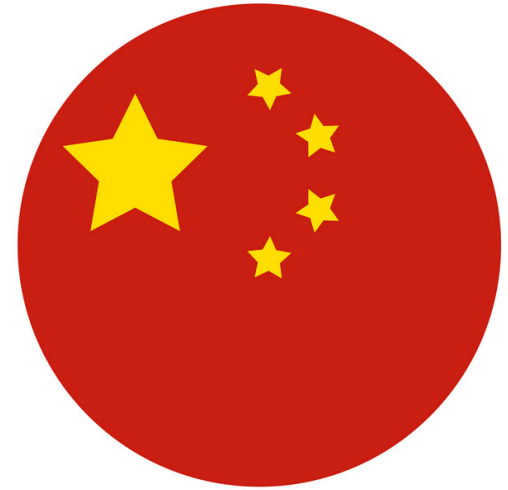
- Ultimately, we can't run away from physics.
- At some point, we need to lay more fibre.
- New subsea builds will focus on a), for now.
- The future will combine b) and c).



## Investing In Cables

 Meta





CHINA



Microsoft

- Most new cables are either built or sponsored by the content/cloud providers.
- China is also a leading investor or contributor to new cables.
- Traditional telco-driven consortium cables are waning.
- Open cables are the growing model. Telco's are becoming followers, no longer leaders.



# Q & A

[mark@transmissionco.net](mailto:mark@transmissionco.net)

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