On building resilient telecom infrastructure | Explained

What does the Coalition for Disaster Resilient Infrastructure report state? Why do telecom networks face elevated risks in coastal regions in times of disaster and calamity? Why are undersea cables preferred over overland cables? Is power failure a significant challenge?

Published – February 20, 2025 08:30 am IST

AROON DEEP

BBMP officials remove Optical Fibre Cables (OFC) which were hanging at Avenue Road, Bengaluru in 2018. | Photo Credit: File Photo

The story so far: The Coalition for Disaster Resilient Infrastructure (CDRI), a multilateral organisation launched by Prime Minister Narendra Modi in 2019, put out a report earlier this month studying Indian telecom networks' preparedness in the event of disasters. The report suggests ways in which State governments can better prepare for calamities that may impact telecom networks.

Why is it important?

Telecom networks are crucial to handling disasters, because they allow the State and National Disaster Management Authorities to communicate quickly with local municipalities and the State and Union governments; something that is important when lives and property are at stake. Telecom networks are particularly vulnerable, as they comprise cabling that may not be fully underground, towers that may not be able to withstand high wind speeds, and because they rely on a steady flow of electricity, which is frequently disrupted by disasters like cyclones and earthquakes.

How are they impacted in disasters?

On top of towers being hit by high-speed winds, overland cables — as opposed to underground ones, which can be protected from many disasters — can snap. Coastal regions face elevated risks, as that is where undersea cables connect India with the global internet. If the landing stations of these cables are impacted, there can be massive network disruptions as telecom operators try to reroute traffic through other cables.

The lack of power during disasters remains a major issue. "When I first joined here, I did my own analysis of data of telecom outages since 2016, and found that the real issue was power," Sanjay Agrawal, deputy director general of disaster management at the Department of Telecommunications said.

What can be done?

Severed undersea cables have a time-consuming repair process that involves a repair vessel arriving near the coast and rejoining the cables. However, since much of the disruption is attributable to power failures, much can be accomplished during a disaster by maintaining or restoring power supply to telecom towers and the network operating centres to which they're connected. Telecom operators have typically never deployed towers assuming 24/7 power supply — with the possible exception of Mumbai — and have battery as well as fuel backup.

Pradeep Kumar Jena, former Chief Secretary of Odisha, said, "sometimes a tower operator may not have enough power available at a time of disaster for whatever reason — one can't [pass around] blame at that point of time," and when this happens, "we decide, let's give every telecom operator 50 litres of fuel." Even if the fuel is wasted, the ₹50 lakh spent on it goes a long way in keeping networks online, he said. This is

complemented with information from the DoT. “We get data from all telecom operators on damages to their assets for every disaster,” Mr. Agrawal said. “We have software to monitor in real time what telecom assets are down.” As such, resources can be deployed quickly to bring sites back online.

How can networks be protected?

The CDRI report recommends a few measures to develop a resilient telecom network These include greater data collection and more coordination among officials, a more robust power infrastructure (resilient power infrastructure is also an area where CDRI focuses an enormous amount of effort on), and requiring cell towers to withstand higher wind speeds, especially in coastal States and districts where hurricanes make landfall. The CDRI also advocates for a dig-once policy, which recommends building as much underground civil infrastructure, like water and gas supply lines, drainage and fibre optic cables simultaneously, reducing the risk of cables being damaged when other infrastructure is built. Existing damage to underground cables can greatly exacerbate disruptions when other parts of a network go down.

“The short- to medium-term roadmap suggests the need to update disaster damage and loss data format, mainstream disaster risk modelling into telecommunications infrastructure planning across all miles, strengthen telecommunications asset design based on local and regional hazard vulnerability profiles,” and other steps to plan ahead, the report says. There are also commercial interventions that the report touches on. A key one is parametric insurance, a system where telecom operators are not left to bear the commercial burden of a disaster all by themselves, and are thus financially incentivised to bring networks back online rapidly (and presumably to nudge them to disaster-proof their infrastructure well enough to keep premiums down).

Telecom resilience comes down to a mix of both massive interventions as well as small investments that can have an outsize benefit. For instance, during heavy rains, diesel generators can stop working even at knee-level flooding. One simple intervention that can go a long way in keeping towers online is by simply installing the generator a little higher up the tower, so that the backup power can kick in even during flooding.

Published – February 20, 2025 08:30 am IST