

Journal of Environmental Media
Volume 4 Number 1

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Received 21 April 2023; Accepted 12 May 2023

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Under pressure: Keeping cables dry in south Louisiana

ABSTRACT

Climate change is impacting the maintenance and repair of last-mile internet connections. In this case study, I describe how telecommunication workers based in south Louisiana maintain ageing digital infrastructures that require cable pressurization, a method used to keep buried wires dry. This work is becoming more difficult due to stronger and more frequent hurricanes, an effect of climate change that is tied to this region's history with extractive industries. Additionally, this maintenance work can come at the cost of being able to update these ageing infrastructures. I argue that maintaining infrastructures in this context is to keep artefacts functioning within an unstable landscape. Ensuring that internet services continue against the backdrop of climate change requires shifts in considering how networks are embedded in specific geographies in relational and material ways.

KEYWORDS

internet infrastructure
telecommunications
maintenance
repair
hurricanes
climate change
cable pressurization

I mean, you don't really hear much of what's going on because like I say, it's pretty much [a] solid cinderblock building and there's all this equipment making noise. But then once the power starts going off and you can hear the standby generators kick off and all that. I mean, you don't realize how bad it is outside. I mean you can look out through the windows and see what's going on.

(Sal, inside plant technician)

On 27 August 2020, Hurricane Laura made landfall in south-west Louisiana. Sal was stationed in the central office of a large telecommunications company.

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As an inside plant technician, his role was to make sure that the power stayed on in the building. The central office contains equipment and cabling, such as telephone exchanges and copper wires to transfer phone calls to landlines. These copper wires also provide digital subscriber line (DSL) as a last-mile internet connection for many residents in the region. Sal stayed inside this nondescript grey building, managing alarms while the Category 4 storm raged on outside. When the storm passed eighteen hours later, he finally slept on the cot they kept in the office. Of course, any rest would be short lived; storm recovery would begin the next day.

The central office that Sal works from also houses an air compressor and dryer. Cables that are placed underground need to be pressurized to keep moisture from infiltrating. While these cables are placed in lead or polyurethane pipes, water from the ground can seep through cracks in the pipe walls. Many of the older wires that make up these cables are wrapped in paper, which acts as insulation from other wires. This paper wrapper connotes the age of the wires – they were buried sometime between four and six decades ago, when paper insulation was cheaper than plastic. This paper insulation also means that these wires are easily susceptible to damage if the paper gets wet. To prevent outages, the central office maintains cable pressurization, where air is pumped through the cable sheath via an air compressor to keep water out. As another technician described, this process can be thought of like blowing air through a straw: ‘if you can keep blowing, water will never come back that straw, right? Until you stop blowing, then the water will come back up the straw’.

In the case of Hurricane Katrina, which devastated the south-eastern portion of the state in 2005, the water came back up the straw. Many central offices lost power, and several of the machines that were maintaining pressure on the cables broke down. Water made its way into the wires, destroying most of the network. In the weeks and months that followed the storm, telecommunications workers were tasked with tearing up the cable that had been damaged or corroded. In its place, they replaced the copper wires with new ones wrapped in plastic insulation. In some neighbourhoods, when the new copper cables were replaced, fibre optic cables were also laid down. In the aftermath of the storm, the telecommunications company was able to accomplish two things: they restored the network, and they updated the equipment. In later storms, they followed this strategy, using hurricanes as an opportunity to make changes to the infrastructure. However, these updates may not be evenly distributed. A study conducted by The Markup found that internet service providers (ISPs) across several US cities, including New Orleans, Louisiana, would offer vastly different internet services for the same price, often providing the slowest service in formerly redlined areas (Yin and Sankin 2022). This price difference can be due to the cost of maintaining older systems. After Hurricane Laura, thanks to Sal’s vigilance, the compressor machines stayed on. As a result, the paper-insulated wires stayed dry, and thus remain in the ground.

The ability for these wires to stay dry is a remarkable feat. South Louisiana is a wet place. Most of the land that makes up the bottom portion of the state is the result of deposits of silt brought upstream by the Mississippi River over the course of thousands of years. This means that a spongy and porous layer of wetlands is all that keeps this place a few feet above sea level. Wires placed underground are surrounded by damp earth, the pipes they lay in prone to the movement of the subsiding land.

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South Louisiana is also disappearing underwater. Underneath the wetlands lie deposits of fossil fuels. The first oil well in Louisiana was struck in 1901 and by the mid-twentieth century, the oil and gas industry had expanded throughout the region. Extractive infrastructures such as oil wells, pipelines and shipping canals are carved into the fragile wetlands to bring oil to petrochemical industries that now sit on former plantations upriver. This segmentation of the land speeds up erosion of this ecosystem, which acts as a crucial buffer for coastal communities from water and wind damage during storms. The carbon emissions from the oil and gas industry also contribute to warming ocean waters, and subsequently, more frequent and intense storms. A month and a half after Hurricane Laura, the same region was hit by Hurricane Delta, another Category 4 storm, and the fourth storm to have made landfall in Louisiana that year. 2020 was later named the most active Atlantic hurricane season on record.

In her work on undersea cables, media scholar Nicole Starosielski describes how networks become embedded in fixed geographies: 'Cable infrastructures remain firmly tethered to the earth, anchored in a grid of material and cultural coordinates' (Starosielski 2015: 2). Cable pressurization to keep paper-wrapped wires dry is an effort to keep data flowing despite the damp undergrounds in which they reside. Scholars in many academic disciplines often note how infrastructures are always changing – whether through construction, maintenance, failure, decay, abandonment and other processes (Anand et al. 2018; Denis and Pontille 2015; Graham and Thrift 2007). As seen in this case, neither the cables nor the earth are ever in permanent states. The ageing cables are at high risk of failure while the land too, is always changing – from floods and storms, to sea level rise and land subsidence. These same industries that contribute to the deterioration of the landscape also play a role in how south Louisianans get internet service. Most of the electricity across the state is generated by natural gas extracted from the coast, including what gets used for powering energy-intensive cable pressurization equipment. Petrochemical facilities that line the Mississippi River produce the building blocks for plastics, some of which are used to manufacture the coating of water-resistant wires to replace outdated paper ones. The practices of infrastructural maintenance and repair here mean to continually work to stabilize artefacts in landscapes made unstable by the same industries that keep the infrastructures operational.

As we continue to see the effects of climate change in south Louisiana and beyond, it is crucial to examine the limits of these current practices of maintenance and repair. To address these pressing socioecological issues, sociologists Benjamin Sims and Christopher Henke call for 'reflexive repair' to critically consider how repair work can maintain existing infrastructural systems, and in turn preserve the social inequities they produce (Henke and Sims 2020). In this case, the telecommunications company's directive of having technicians maintaining cable pressurization means that the infrastructures will not be updated. Over time, these choices result in not only increasingly fragile and aged infrastructures, but also discrepancies in which areas will have access to faster and more reliable communication services. Simultaneously, the extractive industries that contribute to the subsiding landscape also play key roles in keeping the internet on. Making sure that people will have internet services against a backdrop of climate change requires shifts in how networks are embedded in specific geographies in relational and material ways. In the meantime, technicians like Sal watch over the pumps to ensure that the wires delivering the internet and other services stay dry – for now.

FUNDING

This study was supported by NSF Doctoral Dissertation Research Improvement Grant # 2147052.

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SUGGESTED CITATION

Liu, Jen (2023), 'Under pressure: Keeping cables dry in south Louisiana', *Journal of Environmental Media*, 4:1, pp. 91–94, https://doi.org/10.1386/jem_00098_1

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