

Toxic Infrastructures: An Introduction

Nikolaos Olma and Janine Hauer

For decades infrastructures have been widely seen as the backbone of modernity, a symbol and measure of progress and development and a manifestation of socio-technical imaginaries and futures. Considering the ubiquity and scrutinising the ordinariness of infrastructure, critical social sciences have established a long tradition of “going backstage,” providing a vast body of ethnography of infrastructure (Star 1999: 385) that reveals its politics and poetics (Larkin 2013) and continuously challenges its commonly unquestioned promise (Anand, Gupta and Appel 2018). This collection on toxic infrastructures is rooted in that tradition while placing it in the context of “late industrialism” (Fortun 2014: 310), the current historical moment characterised by incidents and disasters that “are everywhere, eminent and normal” (Fortun 2014, 310). In late industrialism, futures are becoming increasingly toxic, as environmental degradation and bodily harm accompany the decay of infrastructural systems and the collapse of certainties.

Our collection critically examines the processes through which infrastructures are rendered toxic. It does so by unravelling the highly complex and multi-scalar social, economic, political and cultural dynamics that inform the toxic relations between technical systems, contaminants, bodies and capital across spaces, temporalities and scales. The theme “toxic infrastructures” points to a paradox (Howe et al. 2016): although one of the main purposes of infrastructures is to mitigate risk, they can also introduce new risks in ways that transform “the[se] materials of modernity” into “instruments of slow violence” (Hecht 2018: 130). They do so not only by domesticating, enabling and mediating toxic flows as part of their regular operating cycles (Dewan and Sibilá 2023), but also by constituting contaminants themselves, as they mobilise elements, molecules and substances, and even contain and consist of toxic materials and heavily treated substances.



We understand infrastructural toxicity to be a dew point of politics of neglect, deferred maintenance, cost-saving measures, political (non)decisions and lack of accountability, among other things. Such politics reshape infrastructures in ways that make possible nuclear disasters, toxic spills and water crises. In 2014, amid a state of financial emergency, the municipal water supply in Flint, Michigan, was switched from the Detroit Water and Sewerage Department—sourced from Lake Huron and the Detroit River—to the Flint River, in an effort to cut delivery costs. But officials failed to apply corrosion inhibitors to the water, resulting in lead from aging pipes leaching into the supply and exposing around one hundred thousand residents to elevated lead levels. Austerity politics here brought together materials that should not have come into contact (Hecht 2017), turning water from a source of life into a hazard, and infrastructural vitalism into lethality. The Flint water crisis was not a random occurrence—it was one of many consequences of capital withdrawing from Flint decades earlier, with the local state following suit (Pulido 2016). The result was yet another city with a majority African-American population

A landfill in Sachsen-Anhalt, Germany.
Photo: Philipp Baum, 2023.

abandoned and left to grow increasingly poor, revealing infrastructural toxicity as a form of “infrastructural violence” (Rodgers and O’Neill 2012) that is disproportionately borne by racialised bodies and marginalised communities in places with long histories of colonialism, exploitation and institutional violence (Liboiron 2021).

The Flint water crisis serves as another reminder that, in late industrialism, disasters emerge from the “tight coupling between natural, technical, political-economic, social, and discursive systems, all of which are aging, often over-wrought, ossified, and politicized” (Fortun 2014: 310). Particularly significant here is that, more than technical systems, toxic infrastructures are deeply political objects intertwined with systemic injustice, as “polluting practices are frequently not only state sanctioned but are often in fact actively *promoted* by states pursuant to their industrial, financial and development goals” (Hall 2014: 130, emphasis in the original). We can therefore think of infrastructural toxicity as a form of systemic and inherent “planned violence” (Boehmer and Davies 2018), as state and capital force infrastructures to turn against themselves and their intended purposes. Yet we remain aware that certain toxicities are revealed only over time, as infrastructures are co-constituted by material properties too complex to oversee and manage in their entirety—particularly in temporal terms. Chemical elements are not as stable as chemistry suggests (Sawyer 2022), and discussions around the construction of complex infrastructures raise fundamental questions about the behaviour of various materials under stress, temperature, pressure and other environmental conditions. These concerns extend to the ways in which materials age or decay, as well as the kinds of residues or systemic metabolic changes their particles may trigger. In other words, there is no way to anticipate all the types of toxicity and “infrastructural harm” (Kallianos, Dunlap and Dalakoglou 2023) that the complex workings of infrastructural systems might unleash.

Grasping toxic infrastructures requires the rethinking of established divisions, scales and contexts (Liboiron, Tironi and Calvillo 2018), as well as attentiveness to the fact that harm inhabits and shapes environments differentially (Hetherington 2019). That does not make infrastructural toxicity any less potent: it is life-threatening as much as it is—quite literally—groundbreaking, as it fosters new ecologies (Dunbar-Hester 2023) and reorients future thinking (Ahmann 2024). The notion of toxic infrastructures helps us keep this tension in sight, offering a powerful tool to think through and navigate the increasingly “toxic commons” (Müller and Balayannis 2025), and to reconsider the politics and ethics of infrastructural pasts, presents and futures. Toxic infrastructures may necessitate costly remediation (e.g., the removal of asbestos from public buildings) or spark intensive debates about the (im)possibilities of relocating waste or decommissioning nuclear plants—debates that may ultimately lead to abandonment and “wastelanding” (Voyles 2015) and the emergence of sacrifice zones (Lerner 2010). For the extended “toxic timescapes” (Müller and Ohman Nielsen 2023) of toxic infrastructures and their legacies obscure and prolong bodily harm “forward into time—after the factory is gone, after the war is over, after the product is no longer on the shelf, after you no longer have a job, and even after any individual life, or any one body” (Murphy 2017: 2).

The contributions to this collection illustrate the politico-economic processes through which infrastructures become toxic, while also highlighting the social, ethical and epistemological challenges they pose for everyday life, health, environments and

social relations. Andrea Bordoli and Laura Goyhenex both locate toxic infrastructures on Indigenous lands in Canada. Bordoli demonstrates the power of images in exposing toxic infrastructures, while also underscoring the challenges of addressing the underlying mechanisms that would ultimately allow for the attribution of accountability. Goyhenex addresses the emergence of portage trails, connecting Indigenous lands to industrial ports later used to transport uranium—ultimately contaminating the surrounding land. Toxic infrastructures here are mobilised to address both the material itself, which remains the focus of ongoing cleanup efforts, and the relationships that enabled its movement in the first place and which shaped the conditions of its current circulation. Fahmi R. Fahroji shows how local farmers in Balangan, Indonesia, are forced to take jobs with the coal-mining corporation that seized their rubber plantations—depriving them of income—and brought them into close contact with toxic waste. He demonstrates in striking terms the mundane ordinariness of living with toxicity while simultaneously adhering to the promises of development (Harvey and Knox 2012). Gulzat Baialieva takes us to Kyzyl-Alma, Kyrgyzstan, where abandoned trichlorosilane fosters both despair and hope among the local population living amid the ruins of a former semiconductor materials plant. She highlights how major restructuring, imposed by Western financial institutions, led to the plant's bankruptcy, leaving no one accountable for the toxic waste and forcing the local community to find ways to endure the near post-apocalyptic aftermath of neoliberal policies and state neglect.

Jorge Afarian examines asbestos contamination in the Buenos Aires metro system. He explores how workers distinguish between acceptable and unacceptable risks, and how they grapple with the consequences of their exposure while pushing for the removal of these hazardous materials in order to safeguard both themselves and passengers. Juliana Ramos Boldrin traces the accumulation of silica in pneumoconiosis patients' lungs across time and space, emphasising the unequal distribution of toxicity in the context of mining operations in Brazil and the entanglement of infrastructures with colonial logics and inequalities. Margaret Tebbe and Fred Ariel Hernandez draw attention to the normalised presence of toxic infrastructures by examining deferred maintenance at Azusa High School in Los Angeles, advocating for ethnography to play an active role in exposing toxicity. Kaitlyn Rabach's account of defective cement in County Donegal, Ireland—where thousands of dwellings are crumbling and homeowners are exposed to toxic mould, yet do not openly acknowledge the problem so as not to devalue their houses and those of their neighbours—further complicates the tense relationship inherent in toxic infrastructures. Finally, Benjamin Steininger attends to the systemic planetary effects enabled by the upscaling of molecular chemical reactions and processes across a globally distributed infrastructure of production, dissemination and consumption, using the example of ammonia synthesis.

Through this collection, we do not mean to essentialise infrastructures or portray them as evil. Rather, given their centrality and ubiquity in everyday life around the globe, we believe that infrastructures afford a unique lens through which to capture the workings and effects of late industrialism across scales and temporalities. After all, we are fully aware that the infrastructures associated with harm are often the very same that provide employment or deliver much-needed resources—just one example of how infrastructures operate on multiple levels concurrently (Larkin 2013: 335). The articles in this issue highlight infrastructures as dynamic systems that not only enable

movement but also shape ecologies and health across diverse contexts. They delve into the lived experiences of late industrialism, offering expanded perspectives on socio-material networks and their broader impacts.

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