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The Maintainers Study Guide



A guide to ground your practice in principles of maintenance, repair, and care.

**Citation**

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Contributors

This study guide was written and assembled by Liliana Coelho and Lauren Dapena Fraiz; Edited and designed by Kelly Pendergrast; Special Contributors include: Camille Acey, Deb Chachra, Guru Madhavan, Shannon Mattern, Jessica Meyerson, Andy Russell, Ruth Schwartz Cowan, and Lee Vinsel. Funding for this Study Guide was made possible by the Siegel Family Endowment.

Cover image

Korean mechanic's shop. Photo by Sq Lim, via Unsplash.

The Maintainers, July 2025.

Table of Contents

Introduction4

Maintenance Vignettes7

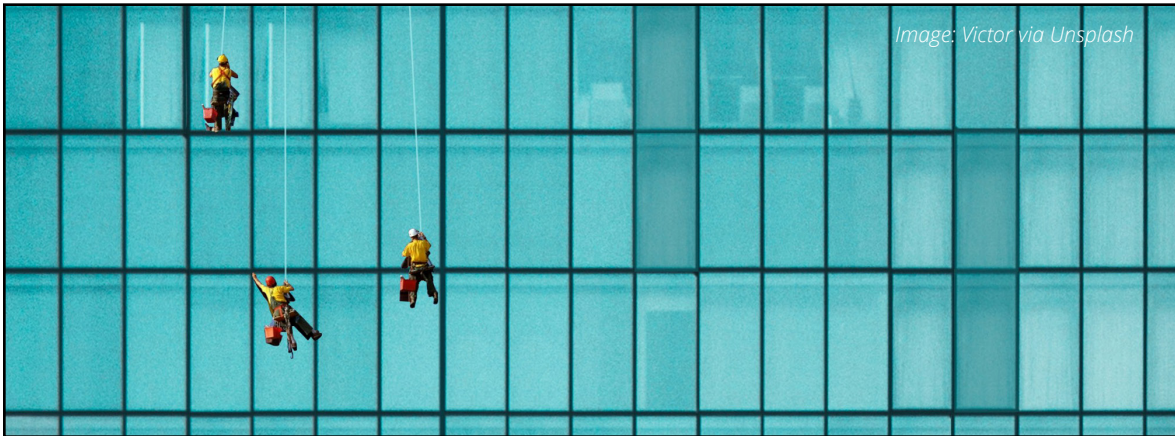
Nine Maintenance Fundamentals11

From Theory to Practice.....15

Keywords.....26

Resources29

Conclusion & Acknowledgements.....35



Introduction

Welcome to The Maintainers Study Guide! This resource explores starting points to furthering a global society that values maintenance, repair, care, and building better infrastructures.

We want to live in a world where maintenance implementation is prioritized, celebrated, and appreciated. Throughout this guide, we will:

- Provide examples of better maintenance practices;
- share fundamentals of our theory;
- explain what it means to put these principles into practice; and
- offer select keywords and resources for you to take this work further.

We understand that defining what maintenance means is often complex. From both a research and practice perspective, maintenance encompasses a lot more than repairing objects. We consider it to encompass a variety of interconnected systems: valuing care labor, preserving bio-regions, safeguarding our data, providing reliable public transportation, and advocating for the workforce that sustains our infrastructures. Maintenance also comprises the mundanity of daily life: brushing one's teeth, tidying the home, mending a sock. At The Maintainers we embrace all forms of maintenance, and aim to uplift the often-invisible labor of those who maintain.

The Maintainers as a project has taken many forms since it began as a conference series in 2015. Since 2020, our programs have expanded to elevate maintenance and repair practitioners alongside scholars and researchers. We consider a collaboration between academia and practice to be an important piece of our vision. We hope The Maintainers can continue to convene people to design alternative frameworks for a well maintained society, together. In the words of Maintainers network member and former advisor, Camille Acey, *"We want our world, but better cared for."*

We're excited this study guide has found its way to you. We hope it provides a starting point for your exploration and implementation of maintenance within your sphere of influence.

What's included?

For this Study Guide, we interviewed key theorists and scholars that are part of The Maintainers network: Camille Acey, Deb Chachra, Guru Madhavan, Shannon Mattern, Andy Russell, Ruth Schwartz Cowan, and Lee Vinsel. We are grateful to them for sharing their perspectives with us, and we encourage you to check out their books and writings for more detailed information on their ideas.

The study guide features on-the-ground applications throughout the past five grant-funded operating years of The Maintainers alongside our contributors' voices. A very special thanks to the 2024-25 Maintainers Steering Committee, composed by former advisors and fellow alumni, who have supported us through a time of network transition: Camille Acey, Sam Bennett, Himani Kulkarni, Mathew Lubari, Nathan Proctor, and Purna Sarkar. Also, to all of our former Maintainers Movement Fellows and community partners, whose hyperlocal work scope is detailed in the section "Theory to Practice". The editing and design of this study guide is thanks to Kelly Pendergrast, long-time Maintainers collaborator and friend.

We hope this study guide will support you. It's meant to be built upon, so we need you to take this work and move it forward.

With care,
Liliana Coelho and Lauren Dapena Fraiz
The Maintainers 2024-25 Co-Directors

Looking at Maintenance in Our World

Maintenance happens everywhere, from the ways we experience systems to the built environment. To ground our conversation on the fundamental theories that inform The Maintainers and our communities of practice, we present this series of vignettes that illustrate maintenance, and failures of maintenance, in a range of contexts. These examples illustrate the ways

that maintenance and maintainers are essential to understanding and supporting effective and sustainable infrastructures that build a functioning world we want to live in. The vignettes are drawn from conversations with our contributors and their published works, spanning a range of time periods, fields, and geographies.

Lessons from the structural maintenance (and non-maintenance) of bridges.

Whether it's a large-scale suspension bridge or a small overpass, bridges contain a classic example of the catastrophic consequences of infrastructure failure. Infrastructure without care is risky, and even deadly. In 2018, the Morandi Bridge in Genoa, Italy, collapsed during a rainstorm, killing 43 people. The bridge was constructed in the 1960s, and by the time of its collapse, many professionals had surfaced the need for extensive maintenance. The bridge's designers mistakenly believed that encasing the steel supports in concrete would protect them from Genoa's salt and air pollution. This was not the case. Rather, the steel elements corroded quite quickly and were never adequately repaired, despite clear signs of deterioration. Despite the fact that a significant crack had appeared on the bridge, a misunderstanding of the degree of safety risk resulted in it remaining in operation a further 14 days before it finally collapsed.

The 2005 collapse of the Interstate 35W bridge in Minneapolis, MN, another infrastructure catastrophe, was also due to the lack of adequate corrosion monitoring.

These incidents underscore a deeper truth: routine maintenance is a form of public care. Routine maintenance inspections and standards serve to ensure our infrastructure stays within safe operational limits to prevent large-scale failures. *Example provided by Deb Chachra from her book "How Infrastructure Works".*



Images: Alessio Sbarbaro, CC BY-SA 4.0

Sacred Maintenance: Hindu temple repair



In some cultures, conducting maintenance is a portal for spiritual practices of transcendence and renewal. It is also a cooperative act of care — of both public goods and cultural heritage.

Hindu temples undergo periodic ritual renovations every 12 years, in a process known as 'Kumbhabhishekam'. These renovations symbolize a re-energizing and spiritual revival for the community, while also functioning as a method for engineering and repair of the physical temple. In Hinduism, the term 'jirna' can be understood as "time-worn", and 'Dhara' means to "advance" or "flow": these concepts



Images: Arpan Mahajan, CC BY-SA 4.0, Rajesh Pamnani, CC BY-NC-ND 2.0

encourage an ongoing cycle of digestion, integration, and progress.

Concepts of sacred repair occur in other cultures as well. In Judaism, 'Tikkun Olam' is the conscious repair of the world that is breaking, and in the modern era is often used to refer to the pursuit of social justice. *Examples provided by Guru Madhavan.*

Finding awe in the everyday: our interdependent world

We tend to move through our days without giving a second thought to the systems that sustain us. Water comes from the faucet, light turns on when we flick a switch, and we think little of it. This is not the case in many places in the world, but some of us take these infrastructures for granted.

However, if we heighten our awareness to appreciate the systems that constitute the backend infrastructure of mundane objects, we can experience a taste of the sublime – a sense of infrastructural awe. Deb Chachra describes this sense of wonder when she reflects on how our phones operate by connecting to signals transmitted from distant satellites, or how a lightbulb switch is connected to a far away dam or energy plant that makes it project light. We navigate our routines without considering the larger infrastructures that hold our lives, and the maintenance necessary to sustain these technologies. We inhabit a highly interdependent world. *Example provided by Deb Chachra from her book "How Infrastructure Works."*



Image: Khanh Do via Unsplash

Unseen labor: amateur weather recorders



Image: Famartin, CC BY-SA 4.0

From predicting the duration of our commute or planning an outdoor weekend activity, we all depend on weather forecasting to manage and streamline our daily lives. What we may not realize is that, in the United States, weather data significantly relies on a network of thousands of amateur weather recorders. They are driven by their passion and love for meteorology, and are trained to meticulously measure and record data in their localities. How do we know that two inches of rain fell in Central Park this afternoon? Likely because a weather recorder went out and took a measurement. These folks typically record information using their



Image: Lerone Pieters via Unsplash

own tools, like barometers and rainfall gauges for rain and storm predictions, and anemometers to measure wind speed and direction. Although their contributions are often underappreciated, we rely on the dedication of these unsung recorders to produce accurate data. *Example provided by Ruth Schwartz Cowan.*

Beyond maintenance of the built-world: understanding care infrastructures

In the world of maintenance, tangible infrastructures like bridges, roads, and tunnels often draw the most attention. However, it is impossible to understand the diverse world of maintenance without taking into account the principles of *care*. So much maintenance is grounded in acts of care by individuals: care for the earth, care for each other, care for neighbors. Both maintenance and care are often overlooked, but care work tends to be more feminized, and even less well-compensated, than maintenance of the built environment. A thriving society relies on care of all kinds – elder care, care and accommodation for the unhoused, support for the disabled, accessible childcare – and failures of care are just as disastrous as failures of maintenance.

As Camille Acey points out *“Some people are just going to need care forever. So thinking as a society, not as a return on an investment, is the kind of society we want to build where everyone who needs care is getting the dignified version of their life.”*



Image: OPPO Find X5 Pro via Unsplash

Who takes care of the first aid kit?



Image: Tom Page, BY-SA 2.0

The first aid kit is a simple toolbox to increase our preparedness and ability to respond to common minor health emergencies. However, as Shannon Mattern asks: *“Who is taking care of the first aid kit? Who ensures that depleted items like band aids are replaced? Who checks to see if the components have expired?”* She considers procuring first aid to be a metaphor for all the resources we need to engage in any act of maintenance: who is maintaining the supplies and social support resources necessary for maintainers across all sectors to keep doing their work? Maintenance is a way of monitoring and organizing our resources, and thinking about who takes care of the (metaphorical and real) first aid kit is a starting point for a wider consideration of all our systems that require regular maintenance. *Example provided by Shannon Mattern.*

The COVID-19 pandemic highlighted the indispensable roles of maintainers and caregivers in society

As families navigated the challenges of working from home while managing household responsibilities, the broader societal dependence on essential workers became undeniable as they risked to ensure our electricity, our food, our water, and our hospitals kept running. In the words of Ruth Schwartz Cowan, *“The pandemic brought to light the dependence on caregivers and maintainers at all levels of society”*. In case there was any question before, the pandemic also undoubtedly revealed the “un-essential” nature of other professions as compared to the critical labor of grocery workers, nurses, doctors, and other frontline workers in the time of an emergency. Although these workers were often romanticized and viewed as heroes during the height of the Covid-19 Pandemic, there are still unresolved questions: What are we doing now to ensure that essential work is carried out in a more collectively distributed manner? How can we implement long-term solutions to address the precariousness of these roles? When will compensate essential workers appropriately, and ensure their health and safety is prioritized?

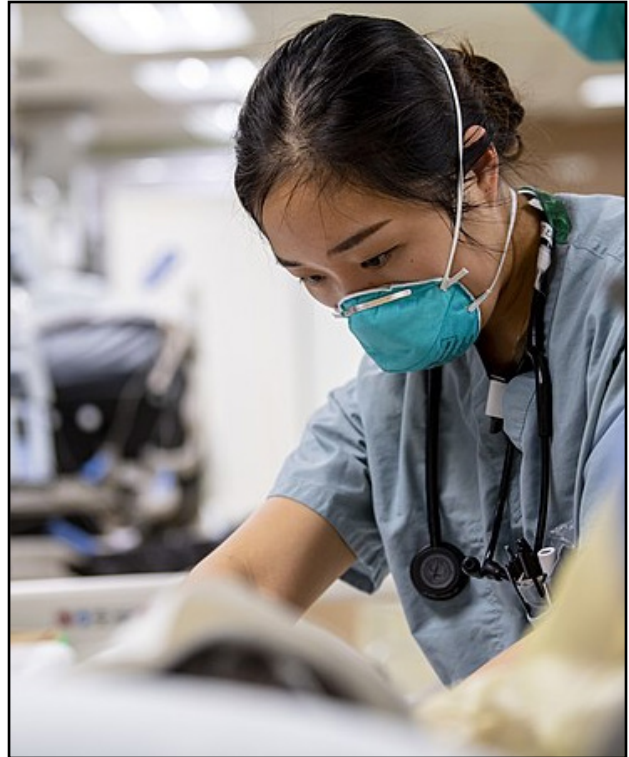


Image: Navy Medicine, public domain

The cost of empty promises in technological innovation



Image: Amit Lahav via Unsplash

For the past couple of decades, Silicon Valley has promoted a worldview and business strategy that encourages entrepreneurs and investors to, in the words of Meta/Facebook CEO Mark Zuckerberg, “move fast and break things”. This ethos advocates for “disruption” and “failing fast to succeed sooner,” often framed as a call to innovate. True innovation is essential (e.g. the case of life saving medical advancements), but the notion of innovation that drives start-up culture can be disastrous when applied to sectors such as public education, electronics, or healthcare.

There are several examples of failed “innovation bubbles” such as the biotech startup Theranos. Their blood testing technology was valued at \$10 billion, but ultimately proved ineffective and they in fact jeopardized patients’ lives. Another example is Samsung’s celebrated “innovation strategy” that led to the production of the Samsung Galaxy Note 7, a model that caused burns and property damage due to its exploding battery. While the dichotomy between innovation versus maintenance is not a clean binary, we urge that by failing to consider maintenance, repairability, and the long-term useability of our technologies, we make the mistake of over-valuing illusions without accountability until it is too late. *Example provided by Andy Russell and Lee Vinsel from their book “The Innovation Delusion”.*

Nine Maintenance Fundamentals

As a starting point for future work, we have synthesized a set of fundamental insights and principles that most key stakeholders of The Maintainers agree with. The fundamentals are distilled from insights provided by our contributor interviews, event presenters, fellow contributions, and other spaces of debate and knowledge sharing hosted by The Maintainers.

Of course, defining a set of fundamentals for a body of work

encompassing such an eclectic set of perspectives is no easy task. This work is necessarily collective, iterative, and incomplete. Far from an objective science, this framework is an attempt to set some sense of shared understanding.

We hope these serve as a grounding and jumping off point for those looking to engage with maintenance as a theory and a practice.





Image: Ruben Hanssen via Unsplash

To reach a world in which maintenance is significantly more valued, a paradigm shift is required.

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01

Our capitalist society rewards, fetishizes, and is fascinated by the “innovative”.

“Innovation” is a term The Maintainers community has long found overused and perhaps over-valorized. In fact, frustration around the tech sector’s hyping of “innovation” is one of the galvanizing forces behind the first Maintainers conferences. While innovation is undoubtedly essential (think medical advancements, or scientific discovery), the obsession with novelty leads to ignoring the care of our existing technologies and built environments, which normalizes unsustainable cycles of obsolescence.

02

Maintenance tasks are typically perceived as mundane, and are often undervalued, underappreciated, and unseen.

Our infrastructures, environments, and even our bodies require ongoing maintenance. However, maintenance work, with its ongoing and often repetitive nature, is less rewarded than work centered around novel production. Maintenance is culturally perceived as a less rewarding activity, which is reflected in the fact that maintenance tasks typically carry less status and often lower pay. As we’ve seen, examples like train lines that never seem to work, catastrophes caused by decaying infrastructures, global sanitation issues, or the precarious conditions of what the Covid-19 pandemic deemed “essential work”: maintenance seldom seems to be a priority until problems become too big to be avoided.

03

We reclaim maintenance as interesting, powerful, and beautiful.

We outwardly celebrate maintenance as a cornerstone of a functioning society. We center and uplift those who maintain, so much so, this is what The Maintainers is all about! We want to live in a world where everyone contributes to our infrastructures, people, and our natural environments are well-cared for. Doing so normalizes maintenance as an essential and very human practice we all engage with.

04

Failures teach us about maintenance.

Well-maintained systems, tools, and infrastructure are often invisibilized, and we don't consider their vulnerability until a challenge arises. It is a failure that provides an opportunity for maintainers to understand why the system failed. We can learn how to invest in prevention of future breakdown, why it failed, and contemplate the importance of a well-maintained system. This may lead to an acknowledgement and re-orientation toward a standard of maintenance.

05

An *Ethics of Care* is a path forward, deciding to maintain infrastructures and objects are implicit acts of care for others.

Maintenance and care are different sides of the same coin. Maintenance is often associated with objects and built environments, while care is viewed as more relational, abstract, and linked to feminized labor. Maintaining is an action of care, ensuring it remains optimal, or at the very least in a safe condition. Crumbling healthcare systems, limited access to childcare, and inaccessible cities for disabled people around the world are proof that strong infrastructures of care still need to be implemented and fairly compensated.

06

Repair Economies prompt us to fix, reuse, and repair.

Many members of The Maintainers community are part of repair networks, a subset of the circular economy movement. *Right to Repair* is a crucial campaign that addresses corporate practices like planned obsolescence and locking down repair. It advocates for a consumer's ability to repair their own items, which reduces e-waste, is budget friendly, and promotes a more sustainable economy. Associated grassroots efforts include repair cafes, tool libraries, and could potentially also encompass other systemic social repair measures such as restorative justice and conflict resolution.

07

When we consider the long-term, we cultivate a generational mindset and success for the public good.

Ensuring long-term maintenance implications and responsibilities is an essential part of any project or well-functioning society. Considerations on lifecycles can be complicated, as they urge us to reckon with our own mortality as well as the life span of our built environment. Living in a well-maintained world provides more possibility to ensure success and reliability for the public good, for generations to come. Think about how future generations will interact with the objects, infrastructures, and work that you cultivate over your own lifespan.

08

Understanding lifecycles: not everything needs to last forever.

While long-term thinking is important, we also don't need to be attached to things lasting forever. Every system or project has a life cycle that transforms its materiality. It begins, evolves, and many of them, eventually end. What matters is cultivating a mindset that considers where it comes from, where it's going, and what happens before and after its existence.

09

We need an interdisciplinary, intergenerational, and global knowledge exchange to forward discourse and practice around maintenance and care.

When it comes to maintenance, a diversity of perspectives and approaches are vital. Specialization and professional silos can isolate us, but engaging a broader community — including across generations — enhances our collective capability and understanding to ensure robust knowledge is passed on. Indigenous worldviews understand human relationship to land as one of stewardship rather than dominance. We must remember that “convenience” in the global north, is often tied to inequity in the global south. Members of our network consider tackling collective maintenance issues as a powerful portal into envisioning a more equitable society. It is time to expand our orientation around knowledge and embody new values as a global society.



From Theory to Practice

How to implement a maintenance mindset when working on a project

By now, you should have a clearer understanding of the crucial role maintenance plays in ensuring the longevity, safety, and integrity of our infrastructures. The real-world examples and fundamental concepts provide us a framework for thinking about maintenance. In this section, we connect maintenance thinking to place-based examples of maintenance in practice. Here we outline some of the impactful and creative projects our fellows, collaborators, partners, and network members have led. We also identify several promising policy directions, and

point to other systemic issues that you may want to connect to in your work. These examples are intended to support your thinking, whether you are a researcher, educator, policymaker, a community practitioner, or simply eager to apply these questions in your own life.

We're grateful to have been able to provide a platform to celebrate and uplift on-the-ground practitioners here at The Maintainers. We hope sharing the stories of these practitioners can serve as inspiration and as a model to your project.

Appreciate and honor the work before you

Recognize and build upon the valuable work that has laid the foundation for your endeavors: don't use precious time reinventing the wheel. A maintenance framework is rooted in historical understanding, it encourages you to identify what already works, but might be under-resourced or neglected. Often when starting a project, there may be others who have done important groundwork that you can learn about first. In our interview with Ruth Cowan Schwartz, she advised practitioners and scholars to, *"start with foundational reading, and then use workflow charts to better comprehend the system you are studying or trying to improve. Think about how each part of the system is maintained and who is responsible for it."*

Maintenance in practice:

- Sarah Sao Habib's Maintainers fellowship centered [Indigenous knowledge, especially around adobe building, and ancient housing material technology](#).
- Librarians are experts in honoring past and present knowledge, which serve as building blocks of the future. Our network members the Information Maintainers discussed this in their white paper ["Information Maintenance as a Practice of Care"](#).
- The Maintainers Reading Group — reading is one of the best ways to become knowledgeable of the great work that has already been done. Perhaps the resources list would be a good place to start your own reading group?



Left: The communal altar at the No Más Muertes aid camp. Alongside the consequences of religious conversion, the symbol of La Virgen offers solace to many on the border crossing journey. Image credit: Sarah Sao Mai Habib (blog post). Right: Aisles of books at the Greenpoint Public Library. Image credit: Lauren Dapena Fraiz.

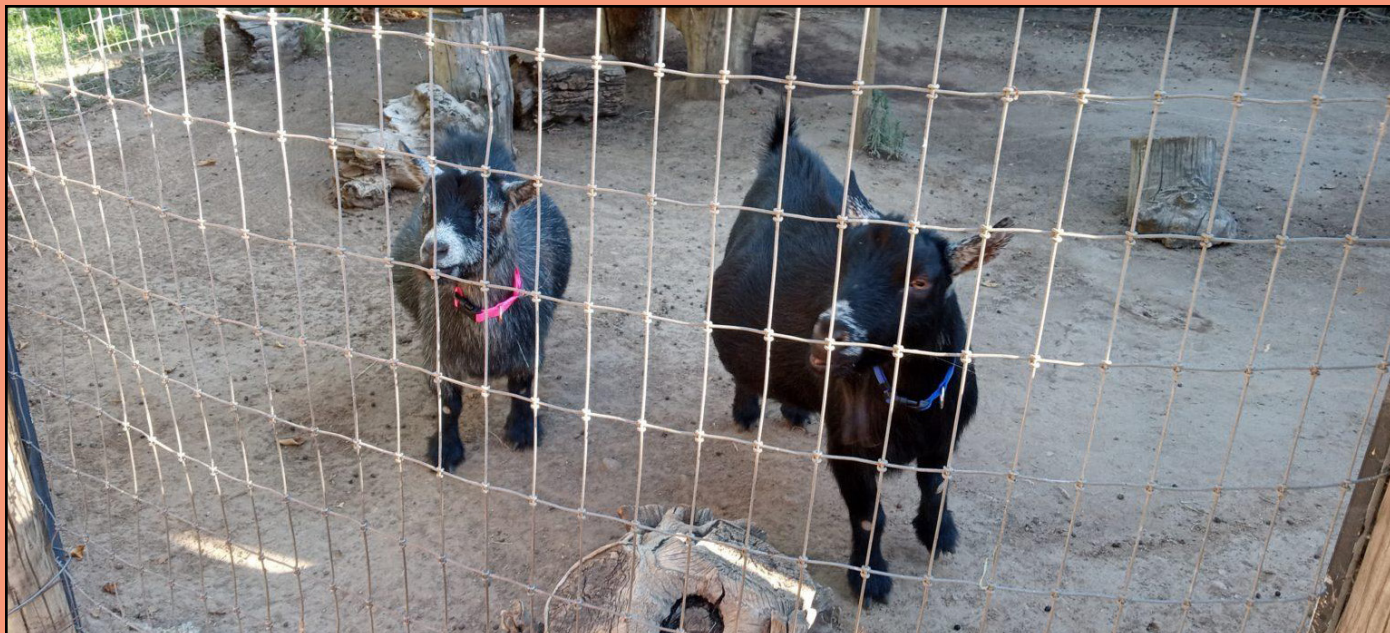
Remember: maintenance, repair and care is a continuum, and it takes time.

Effective maintenance practices demand time and a long-term perspective. Maintenance education, or learning how to fix things, also takes time. Modern Western culture can be very superficial, prompting us to seek novelty, with technologies designed to mine our attention. In this sense, carving time for maintenance, repair, and care in our daily lives represents a collective commitment to prioritizing what truly matters to us. Repair is a way to do this.

Maintaining your belongings instead of replacing and discarding them — which our culture of consumerism disposability encourages — requires time and intention. It can also take money or an initial investment (e.g. needing a physical space or tools), and it is sometimes hard to predict the context of how infrastructure or object use evolves over time. What we do believe is that we need to move beyond cultures of disposability, immediate gratification, and short-term thinking. Maintenance and the development of community and tools to push it forward can be worth it in the long run.

Maintenance in practice:

- At The Maintainers' [Monthly Maintenance Sessions](#), people drop into a virtual accountability event and use the time to take on maintenance projects, recognizing that we often fall-short in creating the time it truly takes to maintain our belongings, workspaces, workflows, and relationships. We encourage you to schedule "Maintenance Time" in your practice or work!
- Practicing principles of "[degrowth](#)", or anything related to slowing down.



Our 2022 Maintainers fellows explored the concept of degrowth, both from an economic perspective as well as a way of life such as the case of urban homesteading. Image credit: Tona Rodriguez-Nikl

Prioritize and value self-care, and the care of those in your proximity

Self-care is essential to sustain yourself, your work, and your motivation. Whenever possible, take time to rest, nourish yourself, and be as well as you can. We recognize that the concept of self-care has often been co-opted into an individualistic framework: in this sense, we need to be committed to supporting others in having space for care. While it's difficult to go against the overworked and under-cared for lifestyle capitalism requests of us, we turn to thought-leaders like Tricia Hersey, who writes in *Rest as Resistance*: *"Treating each other and ourselves with care isn't a luxury, but an absolute necessity if we're going to thrive. Resting isn't an afterthought, but a basic part of being human."*

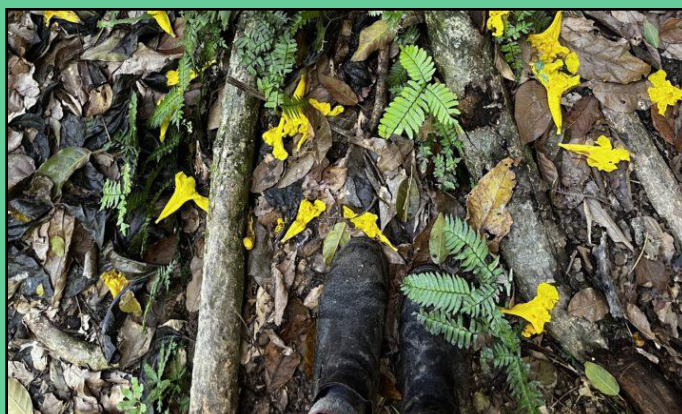
Many Maintainers contributors shared that their interest in maintenance grew from personal health struggles, challenges in their family life, and in the moments they felt like they couldn't keep up. As Deb Chachra puts it *"If you don't schedule maintenance, your body/systems will schedule it for you."* It is best to work within limits, and not be maxed out all the time: let's build more sustainable structures for humans and live in the way we want to live.

Maintenance in practice:

- We explored the question of healing and self-maintenance in the virtual event ["Moving Toward Maintenance"](#) with three practitioners that focused on body work, relationship to environment, and healing.
- Network member and past fellow Rheanna Chen presented self-maintenance in connection to nature in her "Lessons from the Forest" blog series, including ["Rest your Weary Bones"](#) on embracing pause.

Policy:

- Regaining time for life outside of compensated work: Paid family leave, reduction of work week, expand time for care.
- Public and universal access to healthcare.
- Higher pay and protections for labor within caring professions.



"Not everything needs to be done now. What truly matters? There are only 24 hours in a day, there is no need to do it all. There can be another day. Know when to rest, know when to move forward, stay the route." Rheanna Chen, 2022 Maintainers Fellow who studies circles of care, connection, and ecology. Image credits: Rheanna Chen.

Be part of the global repair culture

Acquiring the skills to mend clothes or fixing objects can be challenging, and certain tools of the trade can have safety risks. However, repairing it is worthwhile in the long run: it builds self-sufficiency and is good for your wallet. Most importantly, it can bring a collective shift in how we consume, something anybody in the tool library, Fixers' Collective, and repair movements will be well aware of. Fixer Collective leader Vincent Lai points out, repair and maintenance can, "*bring another level of ownership with the things that are in their lives*" which makes it feel deeply meaningful and offers a new way to connect with our built world.

It is not easy to repair objects, because it is against the interest of larger companies that citizens change their consumption patterns. This is why manufacturers make repair practices opaque, hard to access, and why planned obsolescence exists despite it going completely against the benefit of consumers and our environment. We encourage you to reclaim your agency, and resist by repairing!

Maintenance in practice:

- Participate in [Fixer Collective](#) or in a [Fixit Clinic](#), or check out a local tool library.
- [Culture of Repair](#) is bringing repair into K-12 schools, and working to transform "our culture into one that more readily repairs than purchases".
- The larger Repair Cafe movement, including some Maintainers community members such as Repair Cafe Bengaluru.

Policy:

- The Right to Repair movement advocates for individuals and independent repair shops to be able to fix their own products. It seeks to eliminate the barriers imposed by corporate interests. The movement has challenged companies such as Apple and John Deere. Proposed reforms include requiring manufacturers to sell spare parts at reasonable prices and providing access to repair manuals and specialized tools.



Left: In repairing objects like washers, safety is crucial, as water leakage could be dangerous. Image credit: Vincent Lai, Fixers Collective. Right: Repaired socks showcasing meticulous darning and thus extending their lifecycle. Image credit: Sam Bennett, 2021.



"A maintenance mindset makes you a better complex systems thinker. You get more sophisticated, more interesting terrains by employing the maintenance mindset. To be an innovator, you can survive by just being a very reductionist. People talk about disruptive innovation, but maintenance is about avoiding disruption, which is a complete, completely antagonistic perspective. Most engineers are not disruptors, they work on preventing disruptions."

— Guru Madhavan, Maintainers Contributor



Top: Repair is also applicable to protected natural habitats, such as cave repair of natural formations undertaken by Karst Lab Mexico in the beautiful cenotes of Yucatán, Mexico. Image Credit: Karst Lab Mexico. Right: Scene from a repair workshop for youth in Mumbai, fostering skills and a culture of sustainability, led by Repair Cafe Collective India. Image credit: Gaurang Vaidya, Repair Cafe Collective India.

What we can learn from system failures and deferred maintenance

"Centering maintenance is an opportunity to understand a new narrative. A narrative about a situation we haven't necessarily experienced. You just cannot predict in a complex system how a system is going to fail, because the moment you have predictability, it is not a complex system. Every failure is going to be unique. And I think we can all get better at failure analysis." —Guru Madhavan.

When we reflect on past failures, we can gain valuable insights into how and why things go wrong. Maintenance is closely tied to safety, efficiency, and vulnerability, and deferred maintenance often leads to even larger, and more complex problems. Disasters like power outages highlight how neglecting critical infrastructure maintenance can have catastrophic consequences, and how we can better prepare for them in the future.

Maintenance in practice:

- 2025 Maintainers Impact Fellow [Gabriele Ferri](#) hosted Climate Cafes, inspired by the repair cafe model, to foster knowledge, share solutions, and to build climate resilience after the floods in Bologna, Italy.
- The [Asheville Tool Library](#) was instrumental in filling a service gap when Hurricane Helene left neighbors stranded. They gathered to sharpen chainsaws so community members could clear the roads, and collaborated with the Western North Carolina Repair Cafe to get radio stations up-and-running while broadband services were still inaccessible due to the storms.

Policy:

- We need a substantial investment in our infrastructure. A promising step in the United

States was the Bipartisan Infrastructure Law (BIL), signed in 2021. However, community member Linda McIntyre reminds us that it is essential to follow through to determine whether the investment is effective.

- FEMA resources are meant to address recovery work in disaster areas. Budget cuts result in a lack of recovery for any destroyed infrastructures.
- The European Union recommended in March 2025 for all houses to have an emergency kit with radios, essential medication- for residents to have 72 hours worth of supplies in the case of widespread infrastructure failure e.g. large-scale power outage. Public opinion was split; some saw it as fear-mongering, others as a public safety measure.



Image of a Climate Café discussion tool (designed by Pom Smit) in the series facilitated by Maintainers fellow Gabriele Ferri. This tool uses concentric circles, pins, and threads to visualize the complex network of actors and relations in a climate emergency. Design by Pom Smit. Image credit: Arianna Danti.

Break down knowledge silos: engage with different fields

Embracing curiosity about other disciplines can significantly enrich your work. As Shannon Mattern says, *"Think across different domains and scales, because every practice or discourse of maintenance has important systemic and ecological ramifications and repercussions for all other domains."* This means being open to and comfortable with not knowing, and finding the right people you can ask questions of. We believe that people in closest contact with maintenance roles will be uniquely positioned to guide project design. If this is not possible, it is important their perspective informs that of other people, such as researchers. Researchers have the responsibility to engage the persons most directly responsible for the maintenance labor: who will need to maintain, care, and repair this infrastructure or project day to day?

Infrastructures are interconnected, and gaining insights from outside your own area of expertise can expand your project's scope and effectiveness. Further connection and understanding happens in this cross-pollination, and it can lead to more holistic solutions. The Maintainers strategically focused on adopting an interdisciplinary lens through the range of events and Fellowship cohorts, highlighting the importance of bringing scholars, practitioners, community workers, and citizens together to share insights and advance our common goals.

Maintenance in practice:

- The [Maintainers Meet Ups](#) were designed to serve as a way for people from different disciplines to come together to present their work and formulate a request to the community, whether the request is for funding sources, strategic partners, or simply to help promote their project.

Policy:

- The [New European Bauhaus Compass](#) is a green transition policy funding initiative that explicitly calls for multidisciplinary, interdisciplinary, and non-academic partnerships, reflecting the diverse components of green transitions.



Left: Piper Wilder presented her work with 60Hertz Energy at a Maintainers Meet Up, emphasizing the urgent need for training in solar panel repair, a field that needs further development. Image credit: Piper Wilder. Right: A co-op meeting of EntreAlisios (also presenters at a Maintainers Meet Up), a housing cooperative in the Canary Islands where people at various stages of life - children, adults, and seniors - live together, supporting one another through mutual care. Image credit: EntreAlisios team.

Think long-term, preserve what matters, and understand how to end with care.

To ensure the lasting impact of your work, approach it with a long-term mindset. Consider full lifecycles and prioritize preservation. Take proactive steps to protect your work, especially digital infrastructure, which can be easily lost if not properly maintained. Use backup methods such as paper copies or secure platforms to safeguard important data. Drawing from experience at The Maintainers, maintaining digital infrastructure has become a crucial part of our practices. The true value of your project is not just in its initial launch, but in how it evolves and continues to provide value over time. This can be applied to all fields, as all our built-environments, objects, and systems are in constant flux, and we need to think how they age. By considering future maintenance challenges, you'll better prepare for the ongoing needs of your work, ensuring it can be built upon and sustained for years to come.

Maintenance in practice:

- Nature preservation is an action for the long run and for generations to come. Our 2025 Impact Fellow [Ana Celis](#), of [Karst Lab Mexico](#), developed a project on community cave repair to preserve the Cenotes of Yucatan, one of the most pristine ecosystems preserved by successfully engaging stakeholders from locals, to tourists, to scientists.
- [Engineering for Long Term Solutions](#) was an event hosted in collaboration with 2022 Fellow Tona Rodriguez-Nikl and Long-Now Boston. It explored the ethical and philosophical ideas that guide the methods and conceptual processes for engineering (or re-engineering) our world.
- [The Wind-Down](#) is a closure consultancy founded by Camille Acey to design, build, and deliver more conscious and caring nonprofit closures.
- Shannon Mattern has a compilation of [resources covering project sunseting](#) available on her website.

Policy:

- Seattle's [Deconstruction Ordinance](#) was passed in 2022, setting standards for reusing building materials, a path toward encouraging material preservation over new production.
- The initiative [DIN SPEC 91484](#) in EU also promotes circular construction.- it is a procedure to record building materials as a base to evaluate the potential for a high-quality reutilization prior to demolition and renovation work.



What is left when maintenance ends? Image credit: Leila Behjat and Sam Bennett .

A collective body of knowledge: adapt, iterate and share your own work so others can do the same.

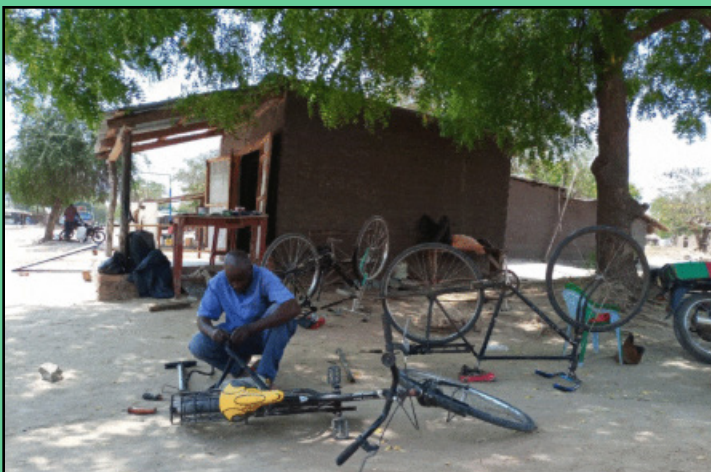
Once you have sought out existing work and acknowledged precedents, you should also acknowledge the uniqueness of your effort or project at this point in time, and understand what needs you are fulfilling. Seeing your work as a part of an ecosystem helps give valuable context to review what you're working on from a variety of perspectives. From the perspective of former tech-leader and organizational wind-down leader Camille Acey, *"I think it is also really helpful to provide training, [especially for] individuals to maintain their [workflow] documentation. So as people come in and out of an organization, they can onboard into the tools they will be using. Usually, at least within the tech realm, we are introducing a service to the mission of the work. We want to actually help people, rather than [have what we're working on] become a project in and of itself."*

How can you consider efforts you've already done as a "draft" of a larger project? Iterate and build upon your work and others, with proper accreditation, to serve as functional groundwork for you, or the next person who will pick up the work after you.

Think about successful collaborative models that are replicable, and how you may need to adapt them based on unique characteristics of your locality or community.

Maintenance in practice:

- The Library of Things or Tool Library model is an object-lending program that allows us to not necessarily purchase, but rather share objects collectively (similar to books in libraries). These programs vary greatly depending on whether they are a membership program, a section within a library, or an object rental company. Visit the [Tool Library Alliance](#) for more info.
- The Repair Café movement has multiple iterations that depend on the context in which they take place. Mathew Lubari has led Repair Cafés in the Rhino Refugee Camp in Uganda, where displacement presents a different set of considerations compared to the model applied in a community where people are permanently housed.



Left: IMr. Kazimingi of CC4D repairs bicycles at the Rhino Camp Refugee Settlement (Uganda). Image credit: Mathew Lubari. Right: The Station North Tool Library operates in Baltimore since 2013. Image credit: The Station North Tool Library.

Solidarity and support

Listen to and support those doing essential maintenance work, such as care workers or community maintainers. Understand their needs and ensure they are compensated fairly and not overlooked. As Lee Vinsel asked in our interview, “*how do you provide tools for people to do good work where they’re at?*” Solidarity with those performing maintenance work ensures it’s recognized as vital, often undervalued, work that sustains communities.

Maintenance in practice:

- Maintainers Fellow Maximillian Alvarez centered his research around [solidarity](#) with maintenance workers (in hospitality, energy, construction, service and essential work) as a basis for a new social infrastructure.
- [RepairCafe Collective India](#) convened a Maintainers Meet Up event to support and promote collective commitment to repair and sustainability in India.
- Worker cooperatives, including platform cooperatives, are grounded in principles of the solidarity economy, where wealth and decision-making power are distributed equitably.

Policy:

- The [Domestic Workers Bill of Rights](#) guarantees basic labor rights and workplace protections for domestic workers such as wage protections and paid time off.
- So many immigrants take on maintenance and care labor. [UNITE HERE Local 11](#), a labor union of the hospitality industry in California and Arizona, advocates for immigrant rights.



Left: Students in the [Netherlands](#) explored two very different underappreciated maintenance work: millers (featured in the image) and death care workers. Image credit: Leiden University students. Middle: Maintainers Fellow Maximillian Alvarez stands with hotel workers and UNITE HERE Local 11 members Glynndana Shevlin, Ada Tamayo, and Maria Isabel in Anaheim, CA, on Dec. 28, 2018. Image credit: Maximilian Alvarez Right: A group of people sitting around in a circle at a Los Angeles tenant union meeting. Image credit: Terra Grazini.

Key Words

There are words that often echo through the digital chambers of The Maintainers network. This section offers a compilation of the keywords utilized throughout the interviews, corroborated alongside The Maintainers Movement Fellows' work, and referenced by The Maintainers network and teams at large. In other words, as Andy Russell says, "these are conceptual cousins to maintenance", and are

starting points for your inquiry and/or research.

A theme explored with the 2022 Maintainers Movement Fellows was "interconnectedness", and we invite you to think about these conceptual cousins to maintenance as interconnected. These are portals to begin and hone your journey in cultivating a culture of maintenance within your networks.

[keywords for building towards]

care

historical research

infrastructure resilience

circular economy

infrastructure

philosophy of maintenance

de-risking

infrastructure maintenance

repair

ethics of care

[keywords for further understanding]

essential workers

practices

social infrastructure

first responders

practical action

stewardship

material prioritization

project management

systems engineering

maintenance

resilience

sustainability

nature of efficiency

housework

technology transformation

optimization

safety critical system

toolkits

[keywords for rethinking]

technological determinism

work



[Reading around the keywords]

In the spirit of enlivening a “maintenance mindset” we invite you to read through these words as you would a poem, slowly and aloud. Notice what they invoke in you, is there a theme you identify between them? How do they show up in your work? Or, notice if they do not show up in the spaces you inhabit.

“It’s really important to have that more holistic view [on maintenance], because each of those different segments impacts the others”

— Shannon Mattern

As Guru Madhavan mentions, *“I think we can argue that maintenance may not exist without failures, failures and maintenance go together, an unavailable coexistence”*. What emotions arise in you as you read these words? Where is there aggravation within your life when you experience a lack of maintenance? Where do you see systems, people, organizations falling short within their approaches to maintenance?

In her interview for this study guide, Shannon Mattern points to the importance of thinking across different domains and different scales, as there are important systemic and ecological ramifications and repercussions for all other domains. She goes on to share an example for those of us building validation of care labor, encouraging us to consider, *“how do you create social infrastructures, transportation infrastructures, and economic incentives to support and maintain [this type of] care? It’s important”*.

The Maintainers is a global network, and yet we recognize that the majority of our events, digital platforms and publications operate utilizing the English language. We acknowledge the limits that come with centering these keywords as only explored within the English language. How can you iterate, translate, and expand these keywords for the context in which you maintain? International cooperation and knowledge sharing is fundamental in advancing an equitable global society, and we recommend that you explore a variety of perspectives as well.



Image: Hobi industri via Unsplash

Resources

Gathering resources is one of our favorite ways to convene ideas into one place. Of course, as you begin to see from getting a taste of the keywords, there are endless directions you can take. The resources below are a compilation between the interviewees, The Maintainers' body of work, The Maintainers Movement Fellows,

alongside an encouragement to follow the threads through the bibliographies within each of these resources, themselves. They are just a starting point for you to get started in your learning about maintenance, repair, and care. There are thousands more resources, and we know there will be thousands more to come.

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NETWORKS & PROJECTS

- [Embodying Degrowth](#), The Maintainers 2022 Fellowship.
- [Fixit Clinics](#)
- [Planetary Limits Academic Network](#)
- [Repair Economy Summit 2024](#)
- [Society for Social Studies of Science](#), an international, nonprofit association founded in 1975 that fosters interdisciplinary and engaged scholarship in STS.
- [Support Driven](#), a community dedicated to customer support as a career.
- [The Endings Project](#), Building Sustainable Digital Humanities Project.
- [The Maintainers Listserv](#), a 2000+ network of maintenance, repair, and care enthusiasts and professionals.
- [Tool Library Alliance](#)
- [VR \(Ex\) Change Network](#)



Conclusion & Acknowledgements

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If you have any questions, feedback or celebrations about the Study Guide, or if you would like to stay up-to-date with The Maintainers community, please connect with us via [The Maintainers website](#).

