THE RESILIENCE SHIFT

SECURING OUR FUTURE THROUGH RESILIENT INFRASTRUCTURE
Creating a shift

Infrastructure is the foundation upon which our society is built. The disruptive and converging forces of climate change, urbanisation and the current technological revolution are eroding that foundation in new and profound ways.

It is essential that we make the right decisions now to ensure a safe, equitable and prosperous way forward for our planet and for everyone. To do this, we must understand the factors that brought us to this point and provide new methods, models, tools and approaches to ensure a transformative approach to building a more stable future in an increasingly uncertain world.

We believe a shift in leadership approach is needed if we are to successfully navigate these challenges. For critical infrastructure worldwide, we need bold, brave action to transform our ways of planning, financing, designing and building, and onwards to operating and maintaining.

Society deserves safe, sustainable and resilient infrastructure. The public is calling for it and future generations will depend on it.

As leaders and actors within the global infrastructure value chain, we must take the opportunity to bring this vision to life. At the Resilience Shift, we are creating a movement to inspire and empower a global community to do just this and we are confident that together, we can create a better world.

Our unique approach

The Resilience Shift uniquely joins two highly respected global firms – Lloyd’s Register and Arup – who have come together to assure the future of critical infrastructure, which is fundamental to the sectors in which they work. The Resilience Shift’s work benefits from and amplifies the breadth and depth of knowledge from our founding partners.

At a time of dynamic global change and challenges, we need innovation and creativity to deliver the most resilient and sustainable solutions. We need to know that our infrastructure networks and services will be able to absorb, and quickly recover from, acute shocks and chronic stresses, and adapt to a continually changing world.

This thinking underpins the founding of the Resilience Shift initiative. We are not just a think tank, not just a grant-making body, and not just a convening network. Our impact is achieved through a proactive approach combining all three of these.
Increasing urgency

Existing infrastructure systems are increasingly complex and interdependent, spreading across national borders and continents, and more and more reliant on sophisticated digital technology. These systems are under pressure from the growing demands of population growth, accelerating urbanisation and climate change. They have become fragile as a result of fragmented governance and a lack of investment, and are now operating in an increasingly uncertain future.

Infrastructure must be prepared for the threats we can anticipate, and respond to those we cannot predict or avoid, so that it continues to provide the essential services on which society depends. An urgent shift is needed in how we think about our infrastructure, and what must be done now to make it more resilient.

$94tn
The global infrastructure gap means there is a need to secure an estimated US$94 trillion of global infrastructure funding by 2040.¹

$650bn
Climate-related disasters have cost the world US$650 billion over the last three years.²

470m
Some 470 million people in 45 cities are expected to face extremely high water stress by 2030, up from 285 million today.³

68%
By 2050 68% of the world’s population will live in cities. That represents 1.5 million people moving into cities every week over the coming 30 years.⁴

175ZB
The global datasphere is predicted to reach 175 zettabytes by 2025 (One zettabyte is a trillion gigabytes).⁵

45%
An equivalent to 45% of the sea freight capacity between Europe and Asia and the transpacific region was cancelled within a few weeks of the Covid-19 crisis.⁶

17SDGs
Infrastructure has a significant role to play in meeting all 17 of the UN’s Sustainable Development Goals.⁷

4:1
For every US$1 invested in infrastructure adaptation, a four-fold return is estimated.⁸
Who we are

Our mission

The Resilience Shift is a catalyst for positive change. Our mission is to help ensure the safety and continuity of the critical infrastructure and services that make our lives possible. From water and transportation through to communications and energy, it is essential to everything we do. We’re working globally to help define this and provide pathways from theory to practice.

Our origins

The Foresight Review of Resilience Engineering was published in 2015, developed from rigorous research and convening experts from around the world. This identified where to focus efforts to make a distinctive and positive societal impact.

Subsequently, we produced Critical Infrastructure Resilience: Understanding the Landscape in 2017. This brief report again collated research findings, including from surveys, expert interviews and focus groups, to define a baseline of critical infrastructure resilience in practice.

These two publications, and the depth of knowledge that sits behind them, have helped to set the path for the Resilience Shift’s work.

Foresight Review of Resilience Engineering

Created by Lloyd’s Register Foundation, this report explores how resilience engineering could enhance the safety of life and property through the improved resilience of engineered structures, systems, organisations and communities around the world.

Critical Infrastructure Resilience: Understanding the Landscape

Defines a baseline for current practice and identifies barriers and opportunities for shifting practice.
What we do

Through a range of initiatives, we want to motivate communities to build social, physical and natural systems that save lives and improve livelihoods, protect the environment, and strengthen markets.

The Resilience Shift’s approach is through learning by doing in collaboration with others, as well as by sharing knowledge and fostering a global community. We want to create value for those we are seeking to influence – maximising the positive impact for society.

We are focusing on tools and approaches to put this shift in resilience thinking into practice, identifying the drivers and enablers for infrastructure resilience, and advancing a common understanding of resilient systems, within and between critical infrastructure sectors.

Influencing policy
Understanding how different mixes of legislation and policy instruments can incentivise and enhance the resilience of critical infrastructure, and shape resilience-led policy making.

Shaping practice
Building a global community equipped with the knowledge and tools needed to drive practice towards better, more resilient critical infrastructure and a safer world.

Sharing learning
Advancing best practice across the infrastructure value chain through collaborative working and fostering knowledge transfer.
Impact to date

40

Dispensed more than 40 grants totalling over £2 million in nine countries.

92

The Resilience Shift has published 92 videos to date on its YouTube channel and the Cape Town Day Zero learning resources library.

50

Created and shared more than 50 freely available publications, knowledge products and digital tools.

3500

Engaged directly with more than 3500 individuals through over 90 events and workshops in 16 countries.

450

Connected with more than 450 organisations who have become part of our community.
10 insights for resilience

These insights, drawn from our work, capture what matters most in creating a shift towards more resilient infrastructure.

Thinking about whole systems
Looking beyond the boundaries of any system and considering interconnectivity and interdependencies.

Overcoming fragmented governance
Encouraging collaboration across different stakeholders in a system and moving away from siloed decision making.

Managing deep uncertainty
Not only mitigating known risks, but being able to respond to, and recover from, those risks we cannot predict or avoid in our uncertain and complex world.

Engaging the whole value chain
Increased resilience for every part of the value chain clearly shows what matters and to whom, and how individual decisions for resilience deliver cumulative benefits.

Demonstrating the benefits of resilience
Improved safety and environmental benefits, along with the positive outcomes for communities, for assets, and the wider economy will help to underline the importance of long-term, holistic investment in resilience.

Focussing on outcome-led approaches
Thinking about what the system does, not what it is will create the shift in practice that is needed for better infrastructure decisions.

Adopting technology to enhance resilience
When using digital technology in infrastructure systems, it is essential to consider its broadest possible impacts to ensure that new vulnerabilities are not created and resilience compromised.

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Transferring knowledge widely
There are many benefits to sharing lessons widely within and between sectors, systems and countries to help achieve a positive impact faster.

Becoming safer, resilient and more sustainable
Prioritise holistic solutions that will enhance safety, are resilient to known and unknown hazards, and align with the principles of sustainable development, as set out in the UN SDGs, for example, in terms of resource use and emissions.

Developing guidance and standards
Guidance, tools and standards are urgently needed to put resilience into practice across all sectors, and to reflect on the other nine insights.
How we do it
Influencing policy

To help strengthen critical infrastructure resilience we want to **break down silos, build partnerships and work with policy makers** from the broadest range of sectors, from business and NGOs to investors and government.

Our work shows that no single policy instrument is the solution to all resilience challenges, and often a blended mix of approaches is best. Many examples of good practice can be transferred between sectors and geographies.

We undertook a series of activities looking at the success of different policy instruments in Australia, convening government, academia and private sector stakeholders at a symposium in Melbourne in May 2019.

Our work to influence water policy began in 2018 with our contribution to the water sector collaboration on the open letter – **Building a Resilient Future through Water** – addressed to the United Nations General Assembly. The Resilience Shift has, with our partners, initiated discussion on urban water resilience with a programme of representations and workshops throughout 2019, culminating in COP25, and continuing with plans for further dissemination in 2020.
A shift of resilience from theory to mainstream practice can be achieved by empowering practitioners to make better decisions and embrace different ways of thinking and working. Our work takes resilience thinking and translates it into practical knowledge products, publications and tools, developed with industry, to support those working in infrastructure resilience across the entire value chain from planning, financing, design and delivery through to operation and maintenance of infrastructure assets.

Convening plays a key part in this, and our work to bring tool users and developers together challenges us all to think about new tools and approaches for designing and implementing resilience interventions, shifting norms and practices, and getting feedback from users, peers and stakeholders on the things that matter to them.

Among the information and support already available to practitioners is the Resilience Shift’s series of resilience primers for sectors including potable water, ports, rail, roads and electricity infrastructure. These draw on industry interviews to produce evidence-based, practical guides for making change.

We co-created the City Water Resilience Approach (CWRA) in response to a demand for innovative ways to help cities build water resilience. It is a practical, system-wide, multi-stakeholder, five-step guide to help cities through assessing and measuring their water resilience, identifying challenges and opportunities to build resilience, and developing an action plan. It includes the OurWater digital tool that maps water infrastructure and governance arrangements to help overcome fragmentation.
How we do it

Sharing learning

For the Resilience Shift’s work to have the broadest practical use and maximum positive impact, it is imperative that we share our knowledge within and between sectors, from city to city and beyond. We are doing this in many ways including through our partnerships, our collaborative projects and events, our support for the global resilience scenario EARTH EX and through publications and communications programmes.

Convening different groups together offers opportunities to explore whole-systems and cross-sector thinking, to understand interdependencies and to facilitate the transfer of knowledge within and between sectors. We have found this to be a powerful tool to engage people from across the value chain of critical infrastructure and to encourage thinking more broadly about the benefits of resilience.

The opportunity to learn from Cape Town’s 2017-18 water crisis was one we could not ignore, and we created a series of film modules to disseminate learning from this crisis. The Resilience Shift partnered with the Cape Town Drought Response Learning Initiative to distil reflections from diverse public and private sector decision-makers into a series of film-based modules. These learning modules are available for organisations and individuals to use via our website and have proved effective in prompting cross-sector discussion in varied settings.

Helping infrastructure stakeholders to learn from the experiences of others, we have hosted a series of round-table discussions on resilience challenges. These include a deep dive into the post-disaster reconstruction of Christchurch in New Zealand and exploring the lessons to be learned from those involved. We have also used the round-table format to focus on the resilience of ports and logistics, and to bring together experts in computer modelling and simulations to explore its use city-scale modelling and simulations for resilience. The strength of this format is in convening diverse groups to create consensus, for example, attendees at our round table with professional bodies agreed on shared actions to promote resilience to their respective audiences.

Endnotes

9. The CWRA was developed by Arup and the Stockholm International Water Institute (SIWI) with support from the Rockefeller Foundation, 100 Resilient Cities and the Organisation for Economic Co-operation and Development (OECD), and in partnership with eight cities worldwide. It is now implemented in Cape Town and Greater Miami.
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The Resilience Shift is a global broker to strengthen resilience in infrastructure.

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We achieve this through a combination of being a think tank, grant-making body, and convening network.

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