

Understanding infrastructure resilience in practice: A methodology

Agenda Setting Industry Stocktaking

Drafted by Oliver Pritchard and Juliet Mian



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Purpose

This short note provides an overview of the methodology used to consult with Arup, forming part of the RS agenda setting phase.

Why did we consult?

During the first year of the RS, as part of an agenda setting stage, we consulted with [Arup](#) to get views on current practice in critical infrastructure resilience. To date, '*resilience engineering*'¹ has been led by theory more than practice and that it is vital that practicing designers and engineers take the lead now and establish communities of practice, sharing experiences and supporting each other, as needed.



This short note describes how we approached the Arup consultation. We are hoping that others will be inspired to replicate, and improve on, our approach within their own organisations. Not only will this help us to widen our knowledge of critical infrastructure resilience in practice, it will build a resilience community, help us to shape the RS visions and outcomes and ultimately build up an industry-wide sense of current practice.

Consultation approach

We found that a combination of three consultation methods used was successful in obtaining the widest range of views within Arup, given that we were constrained in terms of time and resources, and wanted to reach out to all of Arup's office locations.

¹ <http://www.lrfoundation.org.uk/publications/resilience-engineering.aspx>

The table below summarises these methods, and presents some of the specific lessons learnt, alongside the advantages and disadvantages of each method.

Method	Key to Success	Advantages	Disadvantages
<i>Online Survey</i>	<p>Clear introduction, aims and objectives.</p> <p>Design the survey carefully to achieve best results.</p> <p>Advertise within the organisation. Continue promotion throughout the survey period. Use intranet/news channels/targeted emails.</p> <p>Allow ability to save and return to survey.</p> <p>Ensure free text responses are limited and clearly defined.</p> <p>State that all views are important.</p>	<p>Reaches a large number of people.</p> <p>Enables statistical analysis and graphical representation of results.</p> <p>Can be undertaken at a time suitable to the consultee, providing it can be saved and returned to.</p> <p>Provides anonymity.</p>	<p>Free text responses can be time-consuming to review and summarise.</p> <p>If the survey takes too long, people may not complete.</p> <p>Difficult to convey particularly complex issues with concise questions.</p>
<i>Focus Groups</i>	<p>A diverse range of expertise and backgrounds to ensure comprehensive views.</p> <p>Allow conversations to develop organically.</p> <p>Have at least one facilitator and one scribe.</p> <p>Provide a free lunch if hosting at lunchtime to incentivise attendance.</p> <p>Ideally groups of 7-10 people.</p>	<p>Brings together people with similar interests and helps to build a community within an organisation on critical infrastructure resilience.</p> <p>Diversity of attendees can provide a systems view of infrastructure.</p>	<p>Requires resources to facilitate and manage the session.</p> <p>Availability of consultees may be limited, because of the fixed time and location.</p>
<i>1-to-1 Discussions</i>	<p>Mapping key influencers in an organisation.</p> <p>Design a set of semi-structured questions to ensure consistency and comparability across interviews.</p>	<p>Personal, which helps to build relationships with key influencers.</p> <p>Can give an idea of an organisations view on a topic.</p> <p>Allows time to explore areas of interest in some detail.</p>	<p>Limited number of direct interviews, due to time and budget constraints.</p> <p>Requires interviewer and a scribe.</p> <p>Difficulty in obtaining key influencers' time.</p>

Another important finding was that conversations tended to develop organically, and that allowing this to happen rather than sticking to a defined script was beneficial.

Where did we start?

We consulted with Arup because as well as delivering the RS initiative, it is a global firm of designers, planners, engineers, consultants and technical specialists working across all aspects of the built environment. This provided an appropriate and accessible starting point for us to get views on infrastructure resilience in practice.

When deciding on the consultation approach and the techniques to employ, we asked ourselves the following questions:

Why? - because we need to understand current position regarding infrastructure resilience in practice.

Who? - we needed to cover the widest geographies, skills and sectors.

How? - we only had limited time and budget, which obviously impacts on the level of consultation we could do. We had a 6 week period, which didn't include extensive travel.

What? - we used a range of consultation methods including an online survey, 1-to-1 discussions, and a series of focus group sessions.

Where? – we used a mixture of face-to-face interactions, online survey and telephone calls to cover the widest possible geographies.

What techniques did we use?

Three techniques were used to consult with Arup, including:

- An **Online Survey** with the entire company.
- A series of **1-to-1 Discussions** with key influencers.
- A series of **Focus Groups** with sector specialists and interested stakeholders.

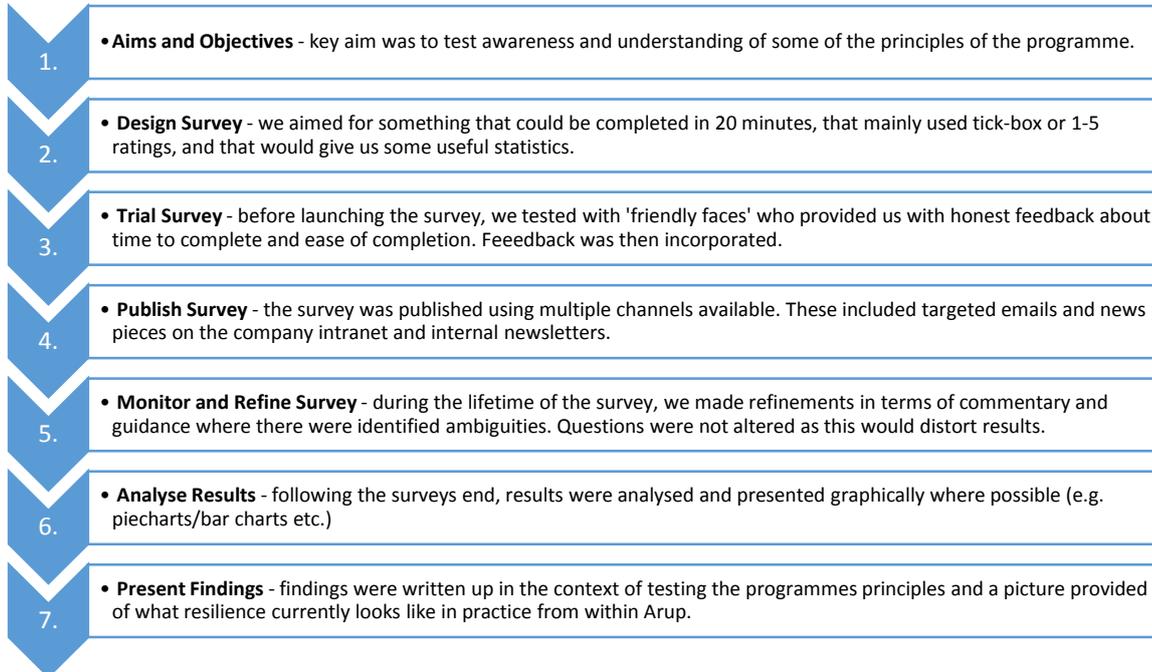
This approach allowed us to both deep-dive into specific aspects of resilience, while also providing a broader understanding in a global context.

From the start, it was made clear to respondents that responses would be made public, aligning with the RS principle of *being open*.

Online Survey

An online survey, which was accessible to the whole of Arup, was the most efficient way to obtain information from individuals. Especially when consultees are located across multiple offices across the globe.

The process that we followed for the online survey is as follows:



1-to-1 Discussions

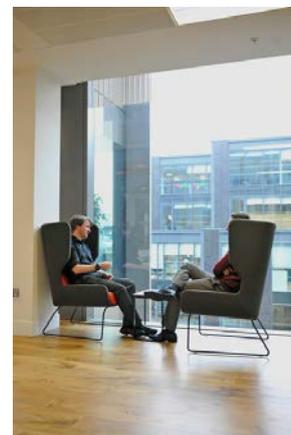
1-to-1 discussions provided a great opportunity to understand views of key influencers within Arup. However, we wish we could have had more time as the level of information that was gained from these discussions was an efficient use of time with such influencers.

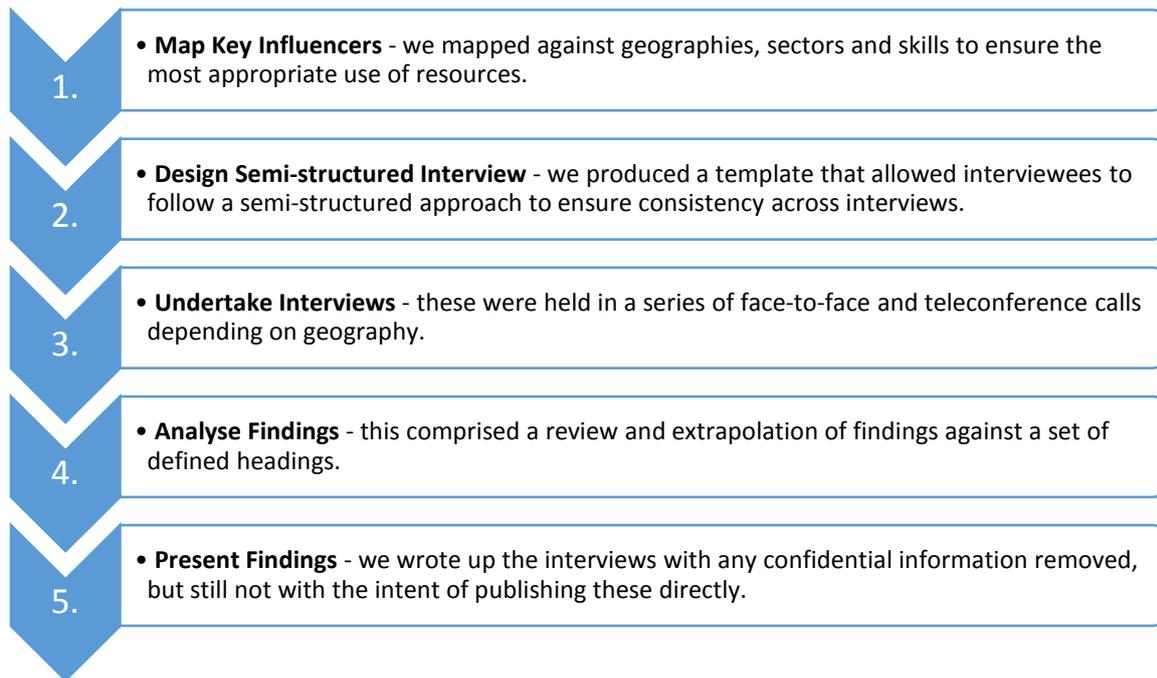
Discussions focused around a semi-structured interview, but conversations were allowed to develop organically. Different geographies also necessitated a combination of face-to-face and telephone conversations.

Overall, as well as understanding current critical infrastructure resilience practice, we also found that 1-to-1 discussions offer an opportunity to:

- Promote the work of the RS to potential key influencers.
- Build relationships and interact with people, more so than an online survey can offer.
- Obtain a wider understanding of an individual's views.

The approach we took in designing and undertaking 1-to-1 discussions were:





Focus Groups

In a series of focus groups, we brought together individuals (generally around 10 per group) to discuss current resilience practice. These included representatives from a range of infrastructure sectors as well as specific specialists (e.g. human behaviours, risk analysts, business continuity experts). This stimulated a more rounded discussion on a range of topics.



We provided each group with a summary of the RS vision and outcomes and suggested a potential topic of interest for discussion. However, we found that conversations often developed organically, which was heavily influenced by group member diversity. But doing this with key topics worked for us. Each discussion brought about their own points of interest. For example, bringing together professionals from multiple infrastructure sectors shed light on the issue of systems complexity within infrastructure resilience practices. Furthermore, someone with knowledge of political, social and/or human factors may provide

information regarding the impact of engineering projects in their social and political setting. In terms of lessons learned, it is worth noting that these focus group sessions were where we received the strongest challenge on what we were trying to achieve and why. We took this as a positive sign of people's enthusiasm for our topic.