Proc. of the European Safety and Reliability Conference (ESREL 2026)
Edited by José C. Matos, Paulo B. Lourenço, Michael Beer, Daniel Oliveira,
Edoardo Patelli, Hélder S. Sousa, Rui A. Silva and Monica Santamaria
 Published by Research Publishing, Singapore.
doi: 10.3850/ESREL2026061419_esrel26-p27762-cd

Improving inter-infrastructural resilience of interconnected critical infrastructure services by strengthening requisite variety capability of operational actors

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"*A common theme in flood disruptions is the vulnerability of critical infrastructures, beyond their own assets, to the failure of other infrastructures*" (Schulman 2024)

Today, infrastructure systems are interconnected, resulting in uncertainty and vulnerability beyond own assets. The uncertainty in interorganizational operations shifts the role of operational actors away from their role as assumed in traditional work designs, considering these actors as merely executers of a predefined plan. Research in the context of complex temporary technical operations (CTTOs) illustrates how interconnected and concurrent operations pose challenges that call on interorganizational operational actors' distributed understanding to assess situations that arise at the intersections of disciplinary areas. It illustrates how these actors apply a temporary interorganizational resilience capability (TIRC) to deal with synchronizing activities, trade-offs, and continuous manoeuvrability. Based on disaster management research suggesting the potential of TIRC in a scenario following an M9 earthquake in the United States' Pacific Northwest, this paper discusses its potential to strengthen requisite variety, the capability to match real-time task demands with immediate available resources across interconnected infrastructures *pre-disaster*.

Keywords: Restoration Resilience, Restoration Capability, Requisite Variety, Pre-disaster, Temporary Interorganizational Resilience Capability, TIRC, Operation, Interconnected Infrastructure System, Uncertainty.

1. Introduction

The North Sea flood on 31 January 1953 caused the deadliest natural disaster in the Netherlands in the twentieth century. A severe north-westerly storm combined with spring tide before a spring flood caused the seawater to rise to exceptional heights. The dykes collapsed and large parts of the country were flooded. 1836 people lost their lives, 72,000 people were evacuated (Rijkswaterstaat 2026). The disaster left deep scars on the people and the landscape.

At the time, existing communication technologies largely failed. Telephone and radio networks became disrupted and left large areas isolated. Local communities became the primary communication network. Boat owners transported people and information between flooded areas and local knowledge of the waterways helped target rescue efforts, while radio amateurs set up a basic emergency radio network. Informal leaders in local communities acted as coordination hubs where the dense local social ties helped enable community-based communication and improvised rescue and relief operations (Zeeuwse Ankers 2026). In short, the first restoration effort relied on communities, not technology.

This example from history emphasizes an important point: in disaster scenarios, interconnected infrastructure systems can domino into the failure of their normal functions. Restoring lifeline services therefore requires requisite variety which, after Ashby (1956), is defined as the capability to match real-time task demands with immediately available resources across interconnected infrastructures. Drawing on Roe and Schulman (2025), this paper places the

value of social ties at the heart of disaster restoration in interconnected infrastructure systems and explores how the social dimension of restoration resilience can reduce vulnerabilities in the restoration capability of interconnected infrastructure systems. In such systems, assets, organizations and governance are interconnected in known and unknown ways.

Restoration resilience is understood as the capacity of interconnected infrastructures and their operators to restore critical services under conditions of extreme disruption by adapting to shifting interdependencies, managing uncertainty, and mobilizing requisite variety in real time (Roe and Schulman 2016). While technical interconnectedness is widely addressed, attention to interorganizational community building remains limited. To advance this underresearched area, this paper explores Temporary Interorganizational Resilience Capability (TIRC) as a *pre-disaster* resource to strengthen restoration capability.

2. Background

2.1.*Work designs under uncertainty*

Only recently, the COVID-19 pandemic has shown that engineered, predictive frameworks alone are inadequate for sustaining reliability in today's uncertain and interconnected systems (Pollock and Steen 2020, Schulman 2021). Transferring this observation to an inter-infrastructural disaster setting where operations may have been disrupted completely or partially to the extent that exceeds normal disruption patterns (Mentges, Halekotte et al. 2023), and where key expertise may no longer be available, formal plans are insufficient or may even increase vulnerability (Roe and Schulman 2016, Roe and Schulman 2025).

Traditional work and governance designs are typically designed for stability and episodic change that can be anticipated well in advance with clear decision paths. Under uncertainty and complexity, however, systems must manage unanticipated events and time pressure, requiring adaptive capability beyond routine plans. Such situations call for adaptation and improvisation. These observations have been confirmed widely, for instance Rochlin (1989), Rasmussen (1993), Weick and Sutcliffe (2001) and La Porte (2006).

Moreover, decision-making autonomy in interconnected systems, can be fragmented across organizational boundaries, requiring negotiation (Wolbers, Boersma and Groenewegen 2018, Treurniet and Wolbers 2021). This changes the role of operational actors.

Multiple studies have highlighted the need for further exploration of how internal governance transpires when permanent organizations collaborate in a temporary organization (Grabher 2002, Abbott 2013, Burke and Morley 2016, Sydow and Braun 2018). Research has also explored the role of operational actors in complex operations for decades. For instance Bourrier (1996) describes how actors continuously renegotiate their participation, Nemeth, Cook and Woods (2004) discuss how actors bridge gaps as they negotiate technical and organizational trade-offs, and Roe and Schulman (2016) observe how practice perspectives come together at the point where actual decisions on the operation are made.

Across domains, there is a call for different management and governance approaches to deal with increasing uncertainty due to operational complexity. From an interconnected infrastructure perspective, Roe and Schulman (2023) point at the limitations of formal systems, particularly when interconnectivity between interconnected systems shifts as a result of failure or system updates. From a disaster perspective, Boersma, Ferguson et al. (2014) argue that the fluctuating operational dynamic, along with the uncertainty and ambiguity involved in a disaster, renders predefined organizational role structures and decision paths inadequate.

The discourse centres on sociotechnical approaches and the relevance of resilience and adaptation capabilities, emphasizing the changing role of operational actors and pointing at the need for mechanisms to deal with such situations in practice (Lundin, Arvidsson et al. 2015).

2.2.*Shifts leading to uncertainty*

Interested in how operational actors in practice deal with uncertainty in temporarily interconnected technical operations, Zuiderwijk (2024) studied these operations cross-sectoral, in chemical construction, rail infrastructure and civil infrastructure. The study identified three social shifts driving uncertainty: a shift from structuring to synchronizing approaches, a shift from siloed specialization to cross-boundary activity, and a shift from episodic adaptation to continuous manoeuvrability. The shift from structuring to synchronizing approaches arises from

unpredictability cascading across tiers of interconnected activities, requiring trade-offs between organizations involved. The shift from siloed specialization to cross-boundary activity is necessitated by the interconnectedness and concurrency in operational activities which require cross-disciplinary collaboration to make sense of situations that arise on the intersections of disciplinary areas calling on interorganizational actors' distributed understanding. The third shift from episodic adaptation to continuous manoeuvrability arises from the fluctuating operational dynamics. It necessitates monitoring of and responding to the fluctuating operational dynamics that can cause activities to interconnect in unexpected ways (Zuiderwijk 2024).

2.3.*Addressing uncertainty in the operation*

Building on these three shifts, and based on in-depth discussions with experts from the three sectors, the study distinguished the key strategies they mentioned for working with the uncertainty arising from these shifts. We grouped these strategies as essential to Temporary Interorganizational Resilience Capability (TIRC).

2.4.*From routine to disaster operations*

Roe and Schulman (2025) highlighted TIRC as a promising concept for strengthening inter-infrastructural requisite variety capability among operational actors pre-disaster, for improving the actors' ability to deal with real-time challenges in emergency situations, reducing vulnerabilities in restoration resilience. This paper explores the rationale for TIRC and its potential value in a disaster restoration setting.

3. Temporary Interorganizational Resilience Capability (TIRC)

3.1.*Complementing formal plans in practice*

Interviews with operational actors on how they dealt with the dynamics involved in addressing uncertain work situations in their day-to-day practice led to three interpretive strategies: micro-conversations, cross-boundary sensitivity and reciprocity (refer to Table 1). In practice, operational actors complement formal plans with interpretive strategies (Zuiderwijk 2024). These strategies help them to collaborate, coordinate, and deal with uncertainty across organizational boundaries despite their differences in organizational signature and the socio-political tensions arising from the trade-offs between stakeholders facing unexpected operational changes. By applying these strategies during operations, operational actors develop an interorganizational capability between them we refer to as Temporary Interorganizational Resilience Capability (TIRC) (Zuiderwijk 2024).

Table 1. Overview of the three TIRC strategies (Zuiderwijk 2024) p.44.

Temporary Interorganizational resilience capability (TIRC)		
Strategy	Manifestation in practice	Enhances
Micro-conversations	Assess "what they are made of" (know-how & dependability) Calling one another to account Discussing doubts and uncertainties Person-to-person informal relationships	Connecting distributed actors
Cross-boundary sensitivity	Bridging organizational and disciplinary boundaries Connecting distributed knowledge Dealing jointly with unexpected events	Connecting distributed activities
Reciprocity	Reciprocity and complex loyalties Goal collectivity Manoeuvrability	Reconciling distributed interests

Table 1 provides an overview of the three strategies: micro-conversations, cross-boundary sensitivity and reciprocity. Micro-conversations are brief, informal, seemingly insignificant conversations between interorganizational actors in the operation. Cross-boundary sensitivity refers to the efforts by individual operational actors to

understand how their activities are connected to those in other parts of the operation by expressing an interest in others' activities and reaching out to the actors engaged in them, and by taking these activities into account in their own work practices. Reciprocity can be understood as a give-and-take process through which actors trade off advantages and disadvantages arising from unforeseen events in the operation.

TIRC facilitates temporary interorganizational collaboration, coordination and change through a light-touch fabric. Micro-conversations connect distributed actors, cross-boundary sensitivity connects distributed activities, and reciprocity reconciles distributed interests.

3.2. *TIRC Strategies and their manifestation*

TIRC works like a muscle and must be trained to perform effectively. The first two strategies, micro-conversations and cross-boundary sensitivity, condition and maintain the TIRC-muscle. The third strategy, reciprocity, activates the muscle in practice, often strengthening it further.

Like a muscle, TIRC can be reinforced through repeated use and different techniques, but it can also weaken or become strained under certain circumstances or through incorrect use. By applying TIRC strategies in different situations, actors gradually develop common ground in their distributed understanding and acting, thereby contributing to interorganizational resilience.

Although the strategies are interconnected, they may occur both simultaneously and separately and are neither necessarily evenly balanced across phases nor equally evident across operations. The ordering presented here is therefore not necessarily definitive, exhaustive or non-arbitrary.

3.3. *TIRC and external governance*

While formally, external governance is bound to prescriptive frameworks, CTTO research shows that in practice, external governance representatives and operational actors engage in what is referred to as operational governance, a practical complement to address gaps, asymmetries and misalignments in prescriptive frameworks (Zuiderwijk 2024).

The Complex Temporary Technical Organization (CTTO) lens, a context-sensitive perspective on complex organizations characterized by technical, organizing, and governance interconnectivity, considers the impact of technological systems in environments where operational failure can lead to severe consequences and, by distinguishing between a temporary organization in which autonomous organizations collaborate and its operation involving the collective assignment of the CTTO, provides detailed insight into the relationship between formal organizational designs, formal coordination, and external governance designs, on the one hand, and practical work situations, on the other, in highly interconnected operations.

Operational governance becomes necessary where a lack of synchronicity among external governance activities poses a risk of suboptimization. This can trigger conflicts and overlaps between external governance domains, which may lead to different agencies taking inconsistent or even contradictory measures.

The compartmentalization of external governance can also have a knock-on effect by extending into organizational frameworks for coordination, performance, and related reward systems. When organizational frameworks mirror the compartmentalization in external governance frameworks, while at the same time interorganizational operational activities become increasingly synchronized, a disconnect can emerge between regulation-inspired organizational frameworks and how activities are actually coordinated in practice. This disconnect can lead to dilemmas and may expose individual actors to personal risk, as illustrated by previous research (Dekker 2011, Hopkins 2012, Stacey 2012).

The societal trend of responding to uncertainty with more and stricter rules raises further concerns as this can constrain the very capability of actors to deal with emerging operational situations, or as Lundin, Arvidsson et al. (2015) put it: "… *strict governance regimes… designed to ensure consistent and predictable delivery cannot fully capture or remove the complexity of organizational collaboration*".

Considering the social shifts mentioned earlier, operational governance stresses the growing reliance on practically skilled and knowledgeable operational actors as uncertainty increases. This reliance stands in stark contrast to the declining availability of deep practical technical experts in the operational workforce.

4. Positioning TIRC in the disaster context

In their study of inter-infrastructural resilience grounded in a scenario involving a potential potential M9 earthquake in the United States' Pacific Northwest, Roe and Schulman (2025) explore how, in the restoration of critical infrastructure services, such as real-time power supply, drinking water and wastewater systems, telecommunications, and road transport, interconnected vulnerabilities can be reduced.

An earthquake of this magnitude would be incredibly devastating. Moreover, the interconnectedness of such complex systems generates uncertainty and vulnerability that extend beyond an organization's own assets (Schulman 2024, Roe and Schulman 2025). In this study, strengthening inter-infrastructural requisite variety capability among operational actors was identified as a critical mechanism for addressing real-time challenges across interconnected infrastructure systems pre-disaster, which motivates the positioning of TIRC as a promising resource.

4.1.*TIRC as a pre-disaster resource*

Drawing patterns between the findings from Roe and Schulman's (2025) report in the inter-infrastructural disaster context and those from CTTO research, this section highlights examples of how cross-learning from the CTTO context can contribute to strengthening requisite variety capability in interconnected infrastructures.

4.1.1.*Micro-coordination*

In CTTO operations, micro-coordination, referred to in the inter-infrastructural context, is grounded in daily informal micro-conversations. Through these conversations, operational actors build rapport that enables them to form a basic understanding of one another's expertise, hold one another to account, and articulate doubts. These abilities are critical in uncertain situations. Leaders recognize the value of this informal binding and create opportunities for such interaction by means of, for instance, shared work areas and informal events. In practice, leaders steer CTTO operations by synchronicity, continuously seeking to make sense of the dynamic interconnectivity and creating projections of possible futures (Jaworski 2011). By moving authority downward, leaders build early rapport, foster informal exchange and enable cross-disciplinary coordination, while remaining close enough to step in when needed. Developing this micro-coordinative capacity in inter-infrastructural settings pre-disaster by encouraging and facilitating informal interaction between operational actors during normal operations can increase requisite variety in disaster settings by reducing the time needed to "know who to call." Moreover, the rapport built through informal interaction increases the readiness to express doubts and call one another to account, which can be critical at times of disruption.

4.1.2.*Joint improvisation*

When predefined plans no longer fit the situation at hand, interorganizational actors in a CTTO operation must collaboratively devise a workable way forward. Connecting the distributed expertise needed for this effort across organizational and disciplinary boundaries relies on cross-boundary sensitivity developed over time, as actors take an interest in one another's operational needs. Similarly, the inter-infrastructural context illustrates how actors must engage in joint improvisation when predefined plans no longer fit infrastructure disruptions. To make joint improvisation work, goal collectivity is essential. In an inter-infrastructural setting, cross-boundary sensitivity and joint improvising can be encouraged through experiments and exercises, not to devise yet another scenario, but to practice improvisation and to enable actors to interact across disciplinary boundaries. This can strengthen requisite variety capability as experimenting expands the range of options available when unexpected events occur, by preventing having to invent the improvisation process under pressure, and by broadening personal networks, strengthening ties across different interest areas. Cross-boundary sensitivity also develops a basic understanding of other disciplinary domains, sufficient to have a conversation on what is needed.

4.1.3.*Using plans as scaffolding*

In CTTO operations, actors use formal plans as a reference, not as a substitute for interpretive action. As gaps emerge in practice, the operation relies on interaction, reciprocity, and the willingness of actors to extend role boundaries in order to adapt to unfolding events. A similar logic emerges from the inter-infrastructural data. Here too, plans are not treated as scripts, and when events expose gaps, plans serve as scaffolding for improvisation. Interorganizational operational actors in both contexts work under uncertainty, which requires

mutual adjustment across organizational boundaries and taking responsibility beyond formal roles to mesh emerging task demands with available capabilities. Developing this capacity pre-disaster supports the strengthening of requisite variety by making it easier to adapt plans to unexpected events and mobilize and recombine resources across infrastructures when conditions change.

The experience, imagination and ingenuity of key actors and how they collaboratively manage to achieve mutual clarity and coordinated action across infrastructures with overlapping service restoration dependencies can be pivotal in infrastructure disruptions, Schulman (2024) argues. Roe and Schulman (2025) further highlight the often-missed opportunity to set up inter-infrastructural networks between operators, in particular pilot-to-pilot, during normal operations through disaster simulation and improvision workshops, to stimulate creative thinking, develop relationships, and create a certain "routine" with such a team, in order to develop reciprocity. CTTO research shows how actors build such interorganizational capability through practice, as actors develop relationships informally while collaborating. These patterns indicate concrete approaches in which pre-disaster equipping can reduce vulnerabilities in restoration resilience.

5. Discussion

What inter-infrastructural crisis situations and CTTO operations have in common is the low validity situation, a setting in which decision-makers face unique conditions or objectives they have not experienced before, such as complex projects, crises or pandemics (Kahneman and Klein 2009).

Growing uncertainty challenges and may even undermine the planning-driven, linear and ideal-type assumptions common in operational management frameworks. Analyses of transboundary crises illustrate that the growing interconnectedness of infrastructure systems leaves societies critically unprepared for disruptions that spill across sectors and borders (Boin 2019).

5.1. *On the suitability of TIRC in inter-infra-structural disaster contexts*

The analysis of the Temporary Interorganizational Resilience Capability (TIRC) in the context of inter-infrastructure systems supports the observation by Roe and Schulman (2025) that it has potential value as a pre-disaster resource to reduce vulnerabilities in restoration resilience. TIRC can strengthen requisite variety through strategies that develop an operational capability helping interorganizational actors to collaboratively anticipate situations predesigned plans are unable to address when infrastructures fail in interconnected ways.

Traditional scenario planning, redundancy and formal coordination protocols widely applied in disaster response assume relatively stable interdependencies and escalation routes. Research on large-scale disruptions in infrastructure systems shows that disasters produce novel configurations of interdependence involving uncertainty and ambiguity, requiring operational actors to coordinate across organizational and sectoral boundaries (De Bruijne 2006, Roe and Schulman 2023). Moreover, Roe and Schulman (2023) argue that incident and continuity plans are not well suited to address fluctuating interconnectivity inherent to inter-infrastructural systems. This is where TIRC can add value, as it prepares actors not based on scenarios, but for capabilities large disruptions require, such as interorganizational sensemaking, synchronization of activities and negotiating distributed interests.

5.2. *Insights and implications*

The analysis shows that TIRC works as a conditioning resource pre-disaster, rather than an emergency response mechanism. While the need for pre-event adaptive capacity based on routines of interaction, and shared interpretive frames was recognized previously, for instance in Nemeth and Hollnagel (2022), a practical set of strategies was lacking. By building interpersonal familiarity and accountability across organizational boundaries through micro-conversations, consideration of how actions affect other areas of the inter-infrastructural system through cross-boundary sensitivity and strategies to accommodate cross-boundary priorities, TIRC expands the range of options available to actors when formal structures fail. In this way, TIRC has potential to contribute to pre-disaster preparation by strengthening requisite variety, the capacity to match the most urgent demands with the immediately available resources (Ashby 1956). However, further research is needed

to explore the transferability of TIRC strategies for the inter-infrastructural context.

The implications of introducing TIRC are that joint exercises, cross-infrastructure exchanges and informal interaction are central to preparedness. While these activities may improve coordination efficiency under routine operations, their key intent is to condition the social infrastructure required for restoration resilience.

A key avenue for further research is the organizational separation between crisis response structures and routine operations, specifically whether bringing crisis organizations closer to or partially embed them in everyday operational structures rather than treating them as an isolated function might improve the adaptive capacity. The analysis also highlights tension between TIRC and dominant governance trends emphasizing standardization, auditability and centralized control. High reliability research has previously shown that overreliance on formal control mechanisms can undermine the discretionary space required for adaptation under uncertainty and ambiguity. Cultivating TIRC pre-disaster requires the strict compliance of these governance elements to be relaxed to a certain extent over time, providing space for manoeuvre to allow for informal coordination, negotiated trade-offs and frontline judgment. The degree to which these boundaries can be relaxed in an operation will become clear over time as the interorganizational ties are strengthening through interaction at the frontline.

When bringing in TIRC as a pre-disaster resource, it will be a capability-in-waiting, reframing restoration resilience through everyday interorganizational practice and activated when infrastructures fail. Hence, it is not a replacement of existing preparedness systems. It complements these systems by addressing the social and relational dimensions of recovery that technical or management systems cannot provide. Thereby, TIRC may provide an infrastructure to replicate what colleague researcher Riana Steen aptly described in informal conversation as “analogue crowd surfing”, reflecting the locally coordinated rescue dynamics discussed at the start of this paper.

6. Conclusion

Building on the work of Roe and Schulman (2025), this paper explores whether Temporary Interorganizational Resilience Capability (TIRC) can add value as a pre-disaster resource to reducing vulnerabilities in the inter-infrastructural restoration resilience of critical lifeline services. TIRC was developed in Complex Temporary Technical Organizations (CTTO) research (Zuiderwijk 2024).

The analysis shows that many coordination needs which inter-infrastructural actors describe as relevant in a disaster context are similar to what is found in routine CTTO operations. Such operations deal on a day-to-day basis with uncertainty, shifting interdependences and fluctuating operational dynamics across interconnected organizations, assets and governance systems. As such, operational actors in CTTO operations, in contrast to their inter-infrastructural peers in relatively stable operations, depend on requisite variety capability on a day-to-day basis. They achieve this through strategies brought together in TIRC, involving their reaching across organizational and disciplinary boundaries, interorganizational synchronizing of activities, and reconciling distributed interests.

When a disaster pushes a relatively stable inter-infrastructural operation into a low-validity environment, operational actors are largely unprepared. Improving requisite variety capability among operational actors could strengthen their ability to manage real-time inter-infrastructural challenges in emergency situations. While further research is required, the analysis illustrates the potential of TIRC as a practical resource for strengthening inter-infrastructural restoration resilience *pre-disaster*.

Other than a response mechanism, TIRC develops restoration resilience pre-disaster; as a capability formed in everyday interorganizational interaction and activated when failure occurs. In this way, it complements existing technical and management systems by developing a social and relational muscle formal systems do not fully capture.

Acknowledgements

The authors would like to thank Paul Schulman, Mark de Bruijne, and Riana Steen, as well as the participants of the Environmental and Climate Mobilities symposium at VU Amsterdam, the Netherlands, on 11 November 2025, for their suggestions at several stages in the conceptual framing of this paper.

References

Abbott, K. W. (2013). The challenges of oversight for emerging technologies. Innovative governance models for emerging technologies. G. E. Marchant, Abbott, K.W., Allenby, B., Edward Elgar Publishing.

Ashby, W. R. (1956). An introduction to cybernetics. London, UK, Chapman & Hall.

Boersma, F. K., et al. (2014). Beyond the myth of control: Toward network switching in disaster management. Proceedings of the 11th International ISCRAM Conference.

Boin, A. (2019). "The transboundary crisis. Why we are unprepared and the road ahead." Journal of Contingencies and Crisis Management (27): 94-99.

Bourrier, M. (1996). "Organizing maintenance work at two American nuclear power plants." Journal of Contingencies and Crisis Management 4(2): 104-112.

Burke, C. M. and M. J. Morley (2016). "On temporary organizations: a review, synthesis and research agenda." Human relations 69: 1235-1258.

De Bruijne, M. L. C. (2006). Networked reliability. Institutional fragmentation and the reliability of service provision in critical infrastructures. Faculty of Technology, Policy and Management. Delft, the Netherlands, Delft University. PhD.

Dekker, S. W. A. (2011). Drift into Failure, From Hunting Broken Components to Understanding Complex Systems, Ashgate Publishing Company, London, England; Burlington, USA.

Grabher, G. (2002). "Cool projects, boring institutions: temporary collaboration in social context." Regional Studies 36(3): 205-214.

Hopkins, A. (2012). Disastrous Decisions. The Human and Organisational Causes of the Gulf of Mexico Blowout. Sydney, CCH.

Jaworski, J. (2011). Synchronicity. San Francisco, USA, Berrett-Koehler Publishers.

Kahneman, D. and G. A. Klein (2009). "Conditions for Intuitive Expertise." American Psychologist 64(6).

La Porte, T. M. (2006). Organizational Strategies for Complex System Resilience, Reliability, and Adaptation. Seeds of Disaster, Roots of Response. P. E. Auerswald, Branscomb, L.M., La Porte, T.M., Michel-Kerjan, E.O. New York, USA, Cambridge University Press

Lundin, R. A., et al. (2015). Managing and working in project society, institutional challenges of temporary organizations. Cambridge, UK, Cambridge University Press.

Mentges, A., et al. (2023). "A resilience glossary shaped by context: reviewing resilience-related terms for critical infrastructures." International Journal of Disaster Risk Reduction 96: 103893.

Nemeth, C., R. Cook and D. Woods (2004). "The messy details - insights from the study of technical work in healthcare." Special issue on studies in healthcare technical work. IEEE 34(6).

Nemeth, C. and E. Hollnagel (2022). From resilience engineering to resilient performance. Advancing Resilient Performance. C. Nemeth and E. Hollnagel, Springer: 1-9.

Pollock, K. and R. Steen (2020). "Total defence resilience: viable or not during COVID-19?" Risk, Hazards & Crisis in Public Policy 12(1): 73-109.

Rasmussen, J. (1993). Deciding and doing: decision making in natural contexts. Decision making in action: models and methods. G. Klein, Orasanu, J., Calderwood, R., Zsambok, C.E. New Jersey, USA, Ablex Publishing Corporation.

Rijkswaterstaat (2026). "Watersnoodramp 1953." Retrieved 4 February 2026, from https://www.rijkswaterstaat.nl/water/waterbeheer/bescherming-tegen-het-water/watersnoodramp-1953.

Rochlin, G. I. (1989). "Informal organizational networking as a crisis-avoidance strategy: US naval flight operations as a case study." Industrial crisis quarterly 3(2).

Roe, E. and P. R. Schulman (2023). "An interconnectivity framework for analyzing and demarcating real-time operations across critical infrastructures and over time." Safety Science 168.

Roe, E. and P. R. Schulman (2016). Reliability and Risk, the challenge of managing interconnected infrastructures. Stanford, USA, Stanford University Press.

Roe, E. and P. R. Schulman (2025). The centrality of restoration resilience across interconnected critical infrastructures for emergency management: a framework and key implications, Oregon Research Institute.

Schulman, P. R. (2024). Infrastructure resilience, climate shocks and sea-level rise incidents: managing uncertainty and the role of a marine exchange extreme climate resilience desk. Storms, Flooding and Sea Level Defense. Oakland, California, USA.

Schulman, P. R. (2021). "Reliability, uncertainty and the management of error: new perspectives in the COVID-19 era." Journal of Contingencies and Crisis Management 30: 92-101.

Stacey, R. D. (2012). Tools and techniques of leadership and management. Abingdon, UK, Routledge.

Sydow, J. and T. Braun (2018). "Projects as temporary organizations - an agenda for further theorizing the interorganizational dimension." Int. J. of Project Management 36(1): 4-11.

Treurniet, W. and J. Wolbers (2021). "Codifying a crisis: progressing from information sharing to distributed decision-making." J. of Contingencies and Crisis Management 29(1): 23-35.

Weick, K. E. and K. M. Sutcliffe (2001). Managing the Unexpected; Resilient Performance in an Age of Uncertainty, Jossey-Bass, USA.

Wolbers, J., K. Boersma and P. Groenewegen (2018). "Introducing a fragmentation perspective on coordination in crisis management." Organization Studies 39(11): 1521-1546.

Zeeuwse Ankers (2026). "Watersnoodramp 1953: slachtoffers en hulp." Retrieved 1 February 2026, 2026, from https://www.zeeuwseankers.nl.

Zuiderwijk, D. C. (2024). Reliable beyond design. The Role of Operational Actors in Dealing with Increasing Uncertainty in Complex Temporary Technical Organizations, Faculty of Social Sciences, Amsterdam, Vrije Universiteit (VU). PhD.