

# Firefighting emergency response exercise – an analysis of standardization and resilience

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## ABSTRACT

This work aims to analyse an emergency response tabletop simulation exercise undertaken as part of Rio de Janeiro (Brazil) State's Fire Department's officer training program and conducted at Rio de Janeiro State's Command and Control Center (CICC). Eleven groups of three officers acting as one played the roles of unit commanders. The exercise concerned the use of a set of SOPs and our research sought to identify sources of resilience and brittleness. From an initial scenario, the inserts escalated the action so as to require the commanders' responses to exercise 12 different SOPs, many simultaneously. This provided the context for the simulation's main goal, which was to exercise and verify the knowledge, use, and suitability of the procedure related to the management of operational events of larger scale, duration, or complexity. Data collection and analysis followed cognitive task analysis methodology and included audio and video recording of the simulation and parts of its two preparation workshops. The simulated exercise showed the relationship between standardization and resilience. Not all of the expected SOPs set were utilized, in part due to the exercise design, in part due to gaps in participants' knowledge of SOPs, and in part due to acknowledged limitations of SOPs to deal with all cases real world contexts. This need for adaptation is an aspect increasingly present in complex systems, such as the one studied here, as the unexpected variability arising from the interaction between the many different elements that compose them can exceed the capacity of the SOPs to deal with it. Knowledge and analysis of the need for adaptation can contribute on different fronts: (i) better training for more conscious and safer recognition, planning and implementation of adjustments; (ii) the design or reformulation of SOPs better able to deal with real activity by considering aspects revealed by brittleness; and (iii) artefacts design to support these demands for recognition and enforcement, ensuring increasingly resilient, efficient and secure systems.

## Keywords

Emergency response, Simulation, Resilience, Standardization, Firefighter.

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