Editorial: Incident Command Systems: A Dynamic Tension among Goals, Rules and Practice

The policy problem in sudden, urgent events is the same in all countries: how can a threatened community mobilize a timely response to save lives, minimize damage and losses, and restore continuity of operations quickly, efficiently and effectively after an extreme event? In response to the challenge of fighting the urban-wildland fires that raged through California in the early 1970s, the United States Forest Service developed a system of rapid organizational management of emergency response operations to dynamically escalating events called the Incident Command System (ICS; Bigley & Roberts, 2001; Moynihan, 2009). This management system sought to modify a hierarchical command and control structure borrowed from military organizations to a more flexible form of organization that could be readily adapted to fit the rapidly changing, dynamic conditions of multi-organizational response operations that characterized wildfire suppression. The primary premise for modifying the command structure was that the 'first person on scene' has critical information that can direct the mobilization of response more efficiently and accurately. The second premise was that timely, valid information should drive decision making in rapidly changing situations. Shifting the command structure from a position of authority to timeliness and the accuracy of information fundamentally altered the practice of managing disaster operations.

In all countries, the goals of emergency response operations in extreme events are fundamentally the same: to (1) save lives; (2) protect property; and (3) maintain and restore the continuity of public services to the community. What differs among countries and indeed, within countries, are the types of threats to which communities are exposed, the urgency of the event, the resources available, the communications infrastructure in place prior to an incident, and the degree of shared professional knowledge and training among responding organizations. These acknowledged differences have led to an effort to codify a set of rules for managing emergency operations among professional personnel. Yet, as the organizational effort to define a systematic set of terms, positions and rules for operation in disaster conditions increased, the very flexibility that emergency managers sought in practice decreased. This becomes even more apparent when the severity of an incident increases, operating conditions vary, urgency heightens, and the scale and scope of the incident escalates beyond the initial set of responding organizations. As such, the tension among goals, rules and demands of actual practice continues as the fundamental challenge for emergency responders operating in the complex, dynamic conditions generated by extreme events.

The balance between control and flexibility in coordinated emergency response is hard to achieve. In the aftermath of Hurricane Katrina that hit the Gulf Coast of the United States in 2005, for example, response operations relied on emergent action, as formal plans broke down in unexpected ways (Majchrzak, Jarvenpaa, & Hollingshead, 2007; Mendonca & Wallace, 2004). The formal response was chaotic and disorganized; if the residents of New Orleans, the city that suffered the most, had not taken self-organizing actions, the disaster would have been even more devastating. Although there is no single cause for the failing emergency response in the aftermath of the hurricane, one cause was the lack of coherent action: organizations had conflicting goals, differed in habitual routines, and used methods that were not aligned with each other (Comfort, 2007; Majchrzak et al., 2007; Moynihan, 2009). For example Lutz and Lindell (2008) analysed the ICS in-use during Hurricane Rita and concluded that the success of ICS varied strongly from one Emergency Operation Center – responsible for the execution of ICS – to another.

For more than four decades, ICS as a framework for managing multi-organizational disaster response operations has been emulated, criticized, adapted and implemented in different forms, not only in the United States, but in many countries around the world. Yet, over these four decades, fundamental changes in information technology have altered the methods, modes and timeliness

DOI: 10.1111/1468-5973.12042

of communication among both professional personnel directly engaged in disaster operations and residents of the communities that are threatened by extreme events. As communication processes have changed, so has the organizational structure for managing disaster operations, and particularly, the interaction among professional emergency response organizations and the communities they serve. Furthermore, in many countries and communities, constrained economic conditions have limited investment by public agencies in resources to support disaster operations, compelling private and non-profit organizations to accept greater responsibility for managing risk, but increasing the variation in knowledge and skills required for effective disaster response (e.g. Helsloot & Ruitenberg, 2004; Comfort, 1994). A major question is whether advancements in information technologies have sufficiently increased the capacity of public, private, and non-profit organizations to assess risk, exchange information, update strategies of action, and function as a 'whole community' in response to urgent threat.

This special issue examines the process of implementation, change and adaptation of ICS as a strategy for mobilizing and managing disaster operations in comparative perspective, focusing on ICS in practice in the United States, France, the Netherlands and Norway. Shorter essays present perspectives on ICS from China, Japan and New Zealand. The question is whether there is a distinctive organizational framework that is recognizable in all countries as the ICS, or whether there is a general set of principles for mobilizing and organizing emergency response operations that has generated a varied set of ICSs as they have been adapted to different operational contexts, resources, and training procedures for emergency personnel.

In their paper, *The United States' experience with the incident command system: what we think we know and what we need to know more about*, Jessica Jensen and William L. Waugh assess the initiation, evolution and adaptation of ICS in the United States over the past four decades, reviewing the research on ICS in practice. In their paper, they note the changes that have occurred in size, scale and complexity of disasters in the United States, and the consequent demands for mobilizing effective disaster operations. They question whether the shared technical knowledge that is sought by the official ICS rules, standards and protocols allows the kinds of tactical adaptation that is necessary to fit the ICS organizational structure to the dynamic set of operating conditions that characterize a large-scale, multi-organizational, multidisciplinary, response system in a catastrophic disaster.

Renaud Vidal and Karlene Roberts present a novel comparison of the French and US training practices in ICS in their paper, *Observing elite firefighting teams: the triad effect*, using a simulation of three different scenarios. Important in their assessment is a measure of 'heedful' interrelating among practicing emergency responders, emphasizing the difference in conscious effort by disaster managers to acknowledge the changing dynamics of strength and vulnerability in organizational response to severe events. They examine the patterns of interaction among emergency responders, and note how differences in the scale of organizational response alter the timing and resources that are mobilized to reduce risk. In France, when small communities, close together, are threatened by a sudden incident, the preferred strategy for emergency response is to act quickly, decisively and with maximum capacity to bring the incident under control before communities suffer serious damage. In the United States, with greater distances between communities and the possibility of isolating risk, more attention is given to determining the appropriate strategy for a given hazard for a particular community.

In their paper, *Incident command and information flows in a large scale emergency operation*, Rune Rimstad, Ove Njaa, Eivind Rake and Geir Sverre Braut provide a perspective on the implementation of ICS in the Norwegian context, using the case of mobilizing search, rescue, and medical assistance in response to the terrorist attacks in Norway on July 22, 2011. The authors, from different disciplinary backgrounds, focus on the information flows among different organizations and jurisdictions that either facilitated multi-organizational emergency response operations or that, by their absence, hindered timely response to a dangerous, uncertain situation. They conclude that in this tense, uncertain situation, the emergent operations structure was based in official and normative emergency plans, but was modified to fit the functional operations located at spatially different sites of response actions, each with its own command structure.

Astrid Scholtens, Jan Jorritsma, and Ira Helsloot, in their paper, *On the need for a paradigm shift in the Dutch command and information system for the acute phase of disasters*, compare the classic implementation of ICS in standard Dutch emergency response operations with an alternative approach implemented in the Drenthe Safety Region in the Netherlands. These authors also focus on the flow of information within and among emergency response organizations as the critical function that drives effective organizational performance and societal impact. They identify and assess underlying design principles of the established Dutch ICS, and present an alternative ICS model that favours flexibility over design. They also note how the standard 'rules' of ICS may hinder appropriate actions to protect community residents in emergency situations by requiring authoritative methods when time and available resources do not permit their implementation.

The three brief essays on the implementation of ICS in China, Japan and New Zealand offer vignettes of

disaster response operations from three countries in the Pacific Region at different stages of development in emergency management systems. In China, Zhang Meilian and She Lian acknowledge the recent development of organized disaster response and compare the performance with the Chinese emergency response operations following different extreme events over the past 10 years. Specifically, they note the gaps in communication and information flow that occurred during the 2003 Chongqing Gas Blowout Disaster, and contrasts that situation with the timely, informed response to the Yu'shu Earthquake on April 14, 2010. Zhang and Lian argue that China is developing very quickly in managing emergency response operations, but that it is also essential for China to enhance its capacity in emergency response, given its high exposure to disaster risk.

Aya Okada and Kenichi Ogura present a brief profile of the evolution of command and information systems in disaster operations in Japan, noting the significant changes introduced following the Kobe Earthquake of 1995 but also how those systems were tested during the 11 March 2011 Tohoku triple disasters. The authors acknowledge the significant differences between the ICS model and the actual operation of information systems and command organizations in Japan, noting how the strong influence of hierarchical organization of daily operations in the Japanese government agencies impedes the collaborative coordination and sharing of information that is central to an effective ICS. The authors also note the emergence of a significant group of private and non-profit organizations that engaged in disaster response operations following the 2011 Tohoku disasters, and identify their integration into the national system of disaster management as a vital challenge for Japan.

In a final brief essay, Sonya Hunt, Kelly Smith, Heather Hamerton and Rebecca J. Sargisson examine the use of ICS in managing response operations to a large oil spill off the coast of New Zealand. Specifically, they review the use of ICS in managing the thousands of volunteers who arrived, unsolicited, to offer their assistance in cleaning up the spill. The authors note that the ICS framework has no provision for organizing volunteers, enabling them to use their time productively as well as contribute substantially to the overall disaster response and recovery effort. In practice, however, managers adapted the principles of ICS to fit the existing need for managing the additional resource of volunteers who gave their time and effort to the clean-up effort.

The set of papers and essays, taken as a whole, provide an informative assessment of the current practice of ICS in seven countries. In general, the papers all grasp aspects of a fundamental challenge inherent in an ICS, which is the tension among developing a systematic set of standards, while leaving room for sufficient flexibility to adapt to changing disaster conditions. In the ICS systems in China and Japan the focus seems to be more on developing a sufficient set of systems, while in most Western countries we start to see a movement towards supporting flexibility. The most tangible example of this movement towards flexibility is visible in the case of New Zealand, which shows how the ICS is adapted in practice to support an emergent group of volunteers. Overall, ICS might be used from the desire to gain control over a complex, chaotic and ambiguous situation, but the empirical evidence in the papers in this special issue show once more that control in the first few hours of large-scale incidents is hard, or even impossible, to achieve. As such, the challenge ahead for ICS is not to be found in the desire to gain control, but in the ability to return to the flexible form of organization it originated from in wildfire suppression, that could be readily adapted to fit the rapidly changing, dynamic conditions of multi-organizational response operations. This should support an adequate information exchange between frontline responders and public leaders attached from the scene of the event, thereby building a stronger connection between ICS and the 'whole community' of public, private and non-profit organizations, to support the capacity of citizen communities to respond to an urgent threat. Enhancing flexibility through self-organization, adaptation is the way forward for ICS to grow into a truly adaptive and integrative response system. In a professional perspective, worthy of ICS, the authors of the papers and essays of this special issue have contributed a very useful assessment of a management strategy intended to facilitate disaster operations under rapidly changing, dynamic conditions.

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