

Organizing Response to Disasters with the Incident Command System/Incident Management System (ICS/IMS)

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Introduction

Five decades of research on organizational response to disasters, together with extensive operational experience, has documented major problems in coordinating emergent multi-organizational networks. These problems have led to the development of systems for standardizing emergency response organizations—the Incident Command System (ICS), the Incident Management System (IMS), and National Incident Management System (NIMS). These systems facilitate coordination by replacing improvised mechanisms with standardized organizational design, positional titles, and emergency response training. Nonetheless, they still have shortcomings that must be addressed in future versions.

Keywords: *Incident Command System, emergency response organizations, disaster response*

1. Organizational Problems in Emergency Response

The development of the Incident Command System (ICS) was stimulated by fire departments' experience during wildfires in Southern California during 1970, in which emergency responders were impeded by disparate organizational structures, inadequate emergency assessments, poorly coordinated planning, uncoordinated resource allocation, and inadequate inter-agency communications. This incident was consistent with five decades of research on organizational response to disasters, which repeatedly found that major disasters require coordinated response by many organizations. Unfortunately, much valuable time is lost while trying to overcome differences in organizational design, positional titles, emergency response training, and organizational procedures [5, 6, 20].

This lack of standardization in the design of emergency response organizations was not an accident. For many years, the federal government provided state and local governments with criteria for evaluating their Emergency Operations Plans [7-9, 15-16, 21]. However, it avoided requiring a specific structure for emergency response organizations. This resulted in a proliferation of organizational structures, positional titles, resource names, and operational procedures that sometimes impeded interjurisdictional cooperation—even among identical emergency response agencies (e.g., fire departments) from neighboring jurisdictions.

The version of ICS resulting from the 1970 Southern California wildfires can be summarized in seven principles [11]. First, all jurisdictions use a common organizational structure defined by standardized names and functions for subunits and standardized names and duties for individual positions (standardization). Second, there is a division of labor so each unit is assigned a specific function to perform (functional specificity). Third, subunits are established to limit the number of personnel directly supervised by each unit manager to (manageable span of control). This is usually five subordinates, but can range from three to seven. Fourth, personnel from a given professional discipline, such as police or fire, are assigned to the same unit in the emergency response organization (unit integrity). This facilitates teamwork and also simplifies recordkeeping. Fifth, most incidents are managed by a single Incident Commander (IC) but, a Unified Command (UC) team manages the emergency response when multiple agencies have statutory authority and responsibility for a specific type of incident (unified command). Sixth, senior incident managers develop action plans that include specific, measurable objectives and evaluate their effectiveness by monitoring the achievement of these objectives (management by objectives). Seventh, the IC or the UC team allocates all resources—personnel, facilities, vehicles, and equipment—to emergency response tasks (comprehensive resource management).

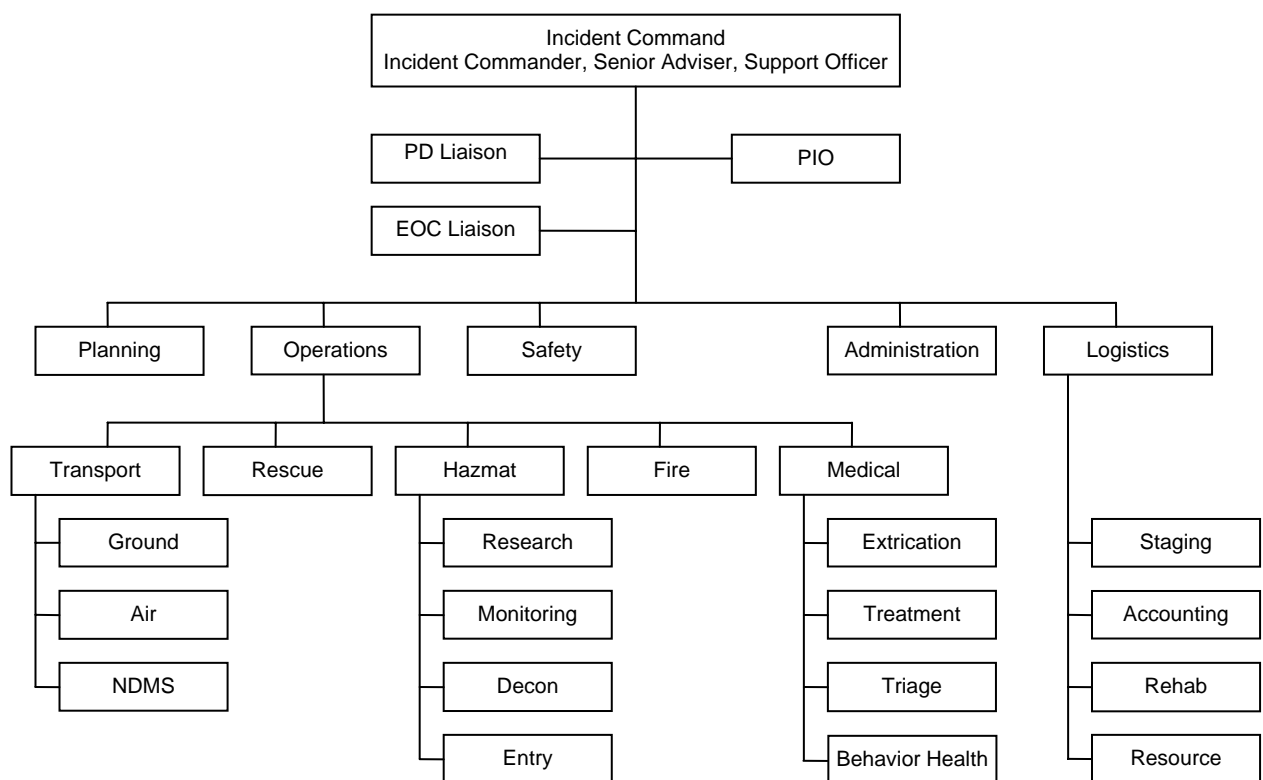
These basic ICS principles were widely adopted during the 1970s, but implementation varied considerably [13]. By the 1980s, FIRESCOPE (Firefighting Resources of Southern California Organized for Potential Emergencies) developed a version of ICS that was a major improvement over previous systems [3]. Later, Alan Brunacini [1-2] revised FIRESCOPE ICS into the Incident Management System (IMS).

2 The Incident Management System

The IMS is a flexible structure for assembling resources and directing emergency response units that is adaptable to all types of hazards. Moreover, it can address very small, routine incidents as effectively as large, complex, multi-jurisdictional incidents. The modular

organization of IMS allows an emergency response organization's size and composition to change as the IC activates only those functional units needed to address current and projected incident demands. In Figure 1, *Command* is shown with five sections directly attached to it. The five sections—*Planning*, *Operations*, *Administration*, *Safety*, and *Logistics*—are staffed as appropriate to incident conditions. *Section* chiefs work with Command staff to formulate an emergency response strategy and then direct tactical operations. In a fully implemented IMS, *branches* are established under sections to implement the tactical operations they have been assigned. *Sectors* are defined beneath branches and execute specific tasks.

Figure 1. Sample IMS organizational structure



IMS implementation. In larger incidents, the ICs supported by a *Support Officer* and a *Senior Advisor*. Moreover, these Command staff are supported by an on-scene *Public Information Officer* (PIO), a *Police Liaison* to coordinate with law enforcement personnel and an *EOC Liaison* to coordinate the flow of information about the hazard agent and response actions, as well as requests for material support.

Within the IMS structure, Command delegates responsibility for implementing its emergency response strategy to the five section chiefs. The *Planning Section* is charged primarily with technical liaison, forecasting incident demands, and other planning functions. The *Operations Section* deals directly with all hazard source control activities at the incident site. Its Hazardous Materials Branch houses sectors representing five principal activities—

research, monitoring, decontamination, site entry, and backup. Fire Branch is charged with the suppression of fires and, as appropriate, operates sectors at a tactical or task level. Medical Branch addresses extrication, triage, and treatment of patients. Rescue Branch is charged with search and rescue and extrication of firefighters who become lost, trapped, or endangered. Transport Branch is responsible for transporting injured persons from the incident scene to hospitals for definitive care. The *Safety Section* is staffed by a Safety Officer who is responsible for mobilizing this unit and maintaining safe operations at the incident scene. The *Administration Section* focuses on procurement, cost recovery, liability, and risk management. The *Logistics Section* is the support mechanism for the emergency response organization.

3 Discussion

The IMS is a flexible structure that can make three significant contributions to emergency response operations [14]. First, standardization can facilitate first responder training because training materials can be readily shared across jurisdictions. Second, IMS can increase the reliability of emergency response operations because its comprehensive structure can decrease the likelihood that important functions will be overlooked in the heat of emergency response. Third, IMS replaces *emergent* multi-organizational networks with *standardized* multi-organizational networks. This avoids time delays associated with lengthy assessments of other response agencies' capabilities and the development of mutually agreed procedures.

The principal advantage of IMS over the earlier ICS is its superior accounting for activities that must be performed away from the incident scene. For example, IMS explicitly addresses activities such as warning, evacuation, and mass care of victims that were not addressed within earlier versions of ICS. Unfortunately, these activities must all be addressed within the Operations Section. For example, an Evacuation Branch (staffed by either police or fire personnel, or both) can be established to coordinate the movement of people from risk areas adjacent to the scene. However, this arrangement requires the Operations Chief at an incident scene to be responsible for branches or sectors that s/he cannot supervise directly (because they are implemented in other locations). Moreover, assignment of these activities to the Operations Chief has the potential for violating the principle of manageable span of control if s/he must supervise warning, evacuation, and mass care branches in addition to transport, rescue, hazmat, fire, and medical branches. These issues are not addressed in current versions of ICS [17-18] but should be addressed in future versions. This will be particularly important as ICS is integrated into NIMS [4, 10].

In addition, empirical research on the effectiveness of IMS or ICS has been neglected. There have been attempts to adapt the IMS more directly to EOCs, but these efforts have been descriptive rather than data based [19]. Currently, the use of IMS rests upon the intuitive strength of the assumption that implementing the seven basic principles of ICS will yield more effective incident management. Ultimately, empirical tests are needed.

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ICS/IMS History

- ICS was originated in 1970 by fire departments frustrated by the incompatible organizational structures they brought to wildfire response operations.
- This lack of standardization was an outcome of the federal government's nonprescriptive approach to emergency planning and response.
 - Federal guidance suggested a process and identified objectives but did not specify organizational structures, positions, or training requirements.

ICS Principles

- ICS has seven basic principles
 - Standardization
 - Functional specificity
 - Manageable span of control
 - Unit integrity
 - Unified command
 - Management by objectives, and
 - Comprehensive resource management

ICS Principles

- **Standardization:** Responding organizations use a common organizational structure with standardized names and functions for subunits and standardized names and duties for individual positions.
- **Functional specificity:** Responding organizations adopt a division of labor that assigns each unit a specific function to perform.
- **Manageable span of control:** Responding organizations limit the number of personnel directly supervised by each unit manager (usually five subordinates, but can range from three to seven).

ICS Principles

- **Unit integrity:** Personnel from a given professional discipline, such as police or fire, are assigned to the same unit in the emergency response organization.
- **Unified command:** Most incidents are managed by a single Incident Commander, but a Unified Command team is used when multiple agencies have statutory authority and responsibility.

ICS Principles

- **Management by objectives:** Senior incident managers
 - develop action plans that include specific, measurable objectives, and
 - monitor their achievement of these objectives.
- **Comprehensive resource management:** The Incident Commander or the Unified Command team controls allocation of *all* emergency response resources
 - Personnel
 - Facilities
 - Vehicles
 - Equipment and materials.

ICS/IMS Structure

- ICS and IMS are defined by five sections (+ liaisons)
 - *Sections* perform broad functions.
 - Sections are divided into *branches*, as additional personnel are needed to perform more specific activities.
 - Branches are divided into *sectors*, as additional personnel are needed to perform individual tasks.
 - *Liaisons* coordinate with specific organizations.
 - The size of each unit depends on the number of people needed to perform the unit's function.

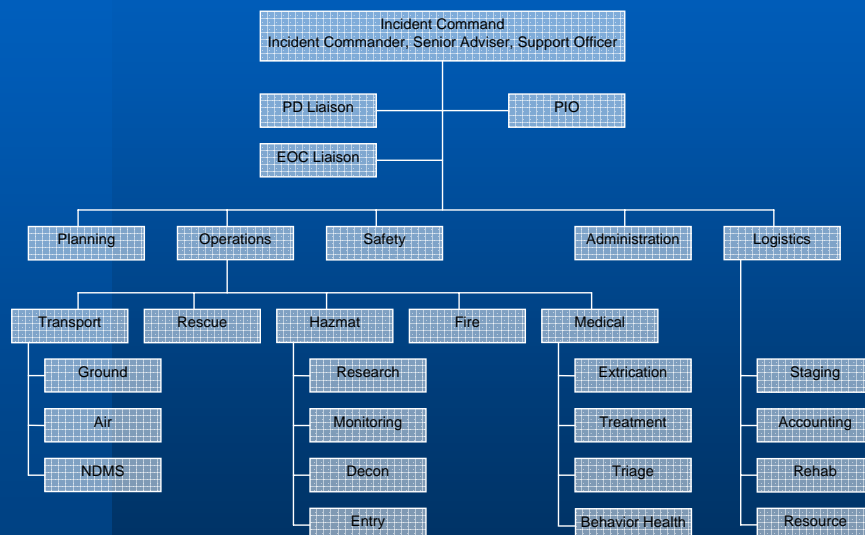
ICS/IMS Structure

- Sections that must be located at the incident scene
 - *Command Section*: The Incident Commander, Senior Advisor, and Support Officer direct emergency operations at the incident scene
 - *Liaisons*: Police Department, Emergency Operations Center (EOC), Public Information Officer coordinate with others away from the incident scene.
 - *Operations Section*: A line function that is responsible for a wide variety of different emergency response operations, depending on the nature of the incident.
 - *Safety Section*: A staff function that supervises operational safety.

ICS/IMS Structure

- Sections that can be located at the EOC (during major disasters)
 - *Planning Section*: A staff function that forecasts incident demands and anticipates resource needs.
 - *Administration Section*: A staff function that focuses on procurement, cost recovery, liability, and risk management.
 - *Logistics Section*: A staff function that monitors and acquires additional personnel, facilities, vehicles, equipment, and materials.

ICS/IMS Structure



ICS/IMS Contributions

- ICS/IMS replaces *emergent* multi-organizational networks with *standardized* multi-organizational networks. This avoids time delays in assessing other response agencies' capabilities and developing mutually agreed procedures.
- ICS/IMS can increase the reliability of emergency response operations because its comprehensive structure decreases the likelihood of overlooking important response functions.
- ICS/IMS standardization can facilitate first responder training because training materials can be shared across jurisdictions.

Conclusions

- IMS is better than ICS in addressing activities that must be performed away from the incident scene.
 - ICS does not address warning, evacuation, or mass care.
 - In IMS, the Incident Commander can establish an evacuation branch to coordinate the movement of people from risk areas adjacent to the scene.

Conclusions

- However, this is an *ad hoc* adjustment that requires the Operations Chief at an incident scene to be responsible for branches or sectors that s/he cannot supervise directly because they are implemented in other locations.
- Moreover, assignment of these activities to the Operations Chief has the potential for violating the principle of manageable span of control if s/he must supervise warning, evacuation, and mass care branches in addition to transport, rescue, hazmat, fire, and medical branches.

Conclusions

- ICS/IMS has substantially facilitated collaboration among agencies responding to an incident scene.
- ICS/IMS needs further development to provide adequate coordination between the Incident Command Post and activities at other locations away from the incident scene.

Conclusions

- The local jurisdiction's EOC can play a major role in accomplishing this objective, especially in
 - Community-wide or regional disasters that have multiple incident scenes, and
 - Chemical, biological, and radiological incidents that have no identifiable incident scene.
- Basic principles remain to be established for coordinating
 - the Incident Command Post,
 - the jurisdictional EOC, and
 - departmental operations centers (DOCs for fire, police, public works, and other agencies).