

WEATHER TRAINING FOR EMERGENCY MANAGERS: A PERSPECTIVE FROM THE EM COMMUNITY

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1. INTRODUCTION

As the primary consumer of information produced by the weather enterprise, the emergency management community (EMs) is a crucial but often overlooked part of the social safety network, one that is often taken for granted. Emergency managers fill a variety of roles, including being called upon to be interpreters of weather information for the public, and planning and responding to events that protect life and property; however, the training currently provided by the weather enterprise does not fully reflect the diversity of these roles. The results presented are based on a preliminary analysis of survey data from a study investigating how training can increase emergency managers' decision-making confidence during weather events.

2. METHODS

This study presented here is embedded within the context of a larger project which aims to investigate social and behavioral influences on emergency managers' decision-making, specifically with the goal of finding interventions which empower emergency managers to make more timely and appropriate decisions during weather-related events. The embedded study was designed to uncover the nature of any possible mismatches between the purpose and content of current trainings on weather for emergency management, and the 'on-the-ground' decision-making needs of EMs.

Researchers used prior qualitative data from interviews and focus groups to prompt the creation of two online surveys focused on exploring emergency managers' training needs. Participants (n = approx. 700) from all FEMA regions except Region 9 were recruited through the email contact lists of local and regional National Weather Service Offices.

3. THE DECISION-MAKING PROCESS

Emergency managers' decision-making process is driven by understanding of four key components: the weather hazard itself; the potential impact; the risk associated with that hazard; and the messaging that conveys this information. There are also four complementary criteria that must be met before

knowledge of these components can be utilized for decision-making: the information must be discoverable; it must be clear; it must be relevant to the decision being made; and it must be trusted.

Currently the weather enterprise is the primary producer of products relating these components to users, and there is increasing recognition of the emergency management communities as major clients for this information. Awareness of the information itself is not sufficient for the decision-making needs of EMs: EMs require understanding of these hazard components *as they relate to their own operations and responsibilities*, and they must have **high confidence** in this understanding in order to make decisions. Deep operational understanding and high confidence enable EMs to make timely, appropriate decisions about weather-related events (Morss & Ralph, 2007). Missing either may cause other actions to be taken as compensation or erroneous decisions to be made.

3.1 CONFIDENCE

Confidence is a complex concept that has been the focus of a large psychological literature (Paese & Sniezek, 1991; Sniezek, 1992), and it is beyond the scope of this abstract to unpack it. For the purposes of the study, however, confidence was operationalized into two subcategories: *competence*, encapsulating skill- and knowledge-based abilities, and *comfort*, which is derived from feelings of trust.

There are many pathways that determine outcomes of competence and comfort for an individual, including beliefs and values and personal experience. This study isolated professional preparation, or training, as one pathway to confidence that is particularly suitable for manipulation by external actors. Operationally relevant training that fosters both skill- and understanding-based competence and feelings of comfort can provide EMs with the confidence to make decisions under time pressure and in uncertain conditions. Without this confidence, however, emergency managers tend to be forced into delaying tactics, such as seeking second opinions or information from other sources. These low-confidence compensation strategies reduce the ability of

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emergency managers to prepare adequately for weather-related events.

4. DEFINING THE PROBLEM

Current training typically attempts to raise the 'weather' knowledge of emergency managers by exposing them to meteorological concepts and techniques. As our subjects made abundantly clear in interviews, this approach is insufficient to create operational understanding and confidence. This result can also be seen in the survey data: 51% of survey participants indicated they had received formal training in weather for emergency management, but 79% expressed that weather training was "extremely" or "very" important in comparison to "other trainings that you need to take". The relatively high number of trained respondents, when contrasted with the apparent desire for additional weather training, clearly signifies a misalignment of the trainings' content and messaging and the needs of emergency managers.

Participants were also asked to list the formal weather trainings in which they had participated; the weather enterprise was a frequently cited provider. The most common trainings were the National Weather Service programs, "Spotter Training" and "Skywarn", and the Federal Emergency Management Agency's "Anticipating Hazardous Weather and Community Risk" online, self-study course. The NWS trainings are general in scope, and designed to fulfill a specific function (the education of potential severe weather spotters), while the FEMA training is a mix of basic meteorology and hazard/threat assessment. The feedback received from EMs, however, informed the researchers that these courses were significantly different in scope from their actual duties. The surveys provided an opportunity for participants to reflect back to the weather enterprise and share, from the EM point of view, what 'weather' training means.

5. RESULTS

Overall, emergency managers identified three crucial areas in which current trainings do not meet their needs or reflect the complexities of their positions: the relevance of the training's content to their operations; a recognition of their position not only as decision-makers but also information brokers for other entities; and the role of building comfort between individuals and organizations through training. These areas demonstrate the necessity not only for a reconsideration of weather training, but a broader rethinking of the relationship between EMs and the weather enterprise as a whole.

5.1 RELEVANCE

The clearest and most common theme emerging from the survey data was that emergency managers cannot and do not want to be meteorologists or even lay experts on weather. Meteorological information, methods, and techniques are only of interest to this community to the extent that it can be directly and immediately used to make operational decisions. When focus groups were asked to identify what weather data they needed during a potential hazard scenario, they provided a list of only six critical elements:

- What (type of event)
- Where (projected location)
- When (time to prepare)
- How long (duration of event)
- Current conditions
- How sure are you? (Certainty)

These six pieces of information, combined with an ability to locate and identify them on weather enterprise products, were the only information requirements that EMs disclosed.

Furthermore, EMs also expressed a strong desire for training on how to translate weather information into *operational decisions*. Honing this skillset, rather than meteorological knowledge *per se*, was quickly and clearly isolated as the fundamental goal of training. In response to a survey question that asked EMs which topics "need to be incorporated into future training", only 23% of participants felt that more meteorology was desirable, while a large majority (> 70%) found topics such as "using weather information for making decisions" and "making decisions when weather information is uncertain" were "needed" or "critical". Greater familiarity with transforming weather information into decision-making, as facilitated by training, is clearly a suitable method for increasing confidence in the emergency management community.

5.2 EMs AS INFORMATION BROKERS

If emergency managers are not confident in their understanding of a potentially hazardous weather event, this uncertainty affects not only their own decision-making, but is conveyed through a much larger network. The weather enterprise indirectly communicates, through EMs, to a wide array of organizations, many of which may not be regarded as 'emergency preparedness' entities. Figure 5.2.1 is from a typical emergency management communication network-mapping case study during a winter storm event in 2008 (Haythornwaithe, 1996).

6. SUMMARY AND RECOMMENDATIONS

The survey results presented in this abstract provide an initial glimpse into the causes and consequences of low decision-making confidence in the emergency management community, and identifies training as one potentially useful pathway for creating greater confidence. To begin incorporating the needs of emergency managers into training, the weather enterprise must consider 1) the relevance of the content to the operational needs of EMs, 2) the role of EMs as information brokers (instead of exclusively decision-makers), and 3) relationship-building as a means to increase trust and comfort. Some potential strategies for achieving these goals might be to train EMs to find the six critical elements of weather information previously mentioned; to assess the impact of weather events in terms of operational requirements; and to consider EMs the 'weather briefers' of their communities; and to build joint training sessions that incorporate knowledge and skills from both senior emergency managers and weather experts. Lastly, the weather enterprise should consider further investigation into EM needs, both by familiarizing itself with the roles and responsibilities entailed in an emergency management position, and by creating platforms for regular interaction and 'deep' user feedback about products, trainings, and services. By working together to increase confidence across both communities, the weather enterprise can better provide for this important client base.

References

- Haythornthwaite, C. (1996). Social network analysis: An approach and technique for the study of information exchange. *Library & information science research*, 18(4), 323-342.
- Morss, R. E., & Ralph, F. M. (2007). Use of information by National Weather Service forecasters and emergency managers during CALJET and PACJET-2001. *Weather and forecasting*, 22(3), 539-555.
- Paese, P. W., & Sniezek, J. A. (1991). Influences on the appropriateness of confidence in judgment: Practice, effort, information, and decision-making. *Organizational Behavior and Human Decision Processes*, 48(1), 100-130.
- Sniezek, J. A. (1992). Groups under uncertainty: An examination of confidence in group decision making. *Organizational Behavior and Human Decision Processes*, 52(1), 124-155.