



21st Annual International Symposium
October 23-25, 2018 | College Station, Texas

**Team Cognition for Coordinated Decision-Making during Hurricane Harvey: A
Case Study from Interviews with Responding Commanders**

Jukrin Moon*, Changwon Son, Farzan Sasangohar, S. Camille Peres, Timothy J. Neville
*Department of Industrial and Systems Engineering and Department of Environmental and
Occupational Health, Texas A&M University, College Station, TX 77843, U.S.A.*

*Presenter Email: jukrin.moon@tamu.edu

Abstract

To protect and assist threatened populations and infrastructures in response to natural and man-made disasters, emergency responders from diverse backgrounds collectively work as ad hoc teams. However, responders' coordinated decision-making in real-time has not been adequately addressed in terms of team cognition. Here team cognition is a binding mechanism that produces coordinated behaviors among responders (adapted from Fiore & Salas, 2004). We are particularly interested in cognition of an incident management team (IMT), an ad hoc strategic decision-making team of command-level responders co-located at the incident command post of major incidents such as Hurricane Harvey. To develop and provide an incident action plan to subordinate branch directors in the field, an IMT continuously manages information based on incoming cues from outside, following a cyclical planning process. Interestingly, an IMT is a team of functional sub-teams, and each sub-team is also a team of functional units.

The purpose of this on-going case study is to investigate the role of team cognition for coordinated real-time decision-making in emergency response, through a case study of a recent disaster, Hurricane Harvey. During the interviews with subject matter experts (SMEs, i.e., responding commanders worked during Hurricane Harvey), we asked how responding commanders as a cognitive system-of-systems (or a team-of-teams) continuously made coordinated decisions, especially in terms of communication and information management. In a prior work, a P·D·A (Perceive·Diagnose·Adapt) model, a theoretical interactionist model of team cognition in emergency response, was proposed as a proof-of-concept that depicts nonlinear, interdependent, and dynamic interactions observed within and among three functional sub-teams of a planning team of an IMT at a simulated incident command post (Moon, Son, Sasangohar, Peres, & Neville, 2018). Through interviews with SMEs, this case study is expected to validate the P·D·A model.

Keywords: Human Factors; Emergency Response; System Safety

References

- Fiore, S. M., & Salas, E. (2004). Why we need team cognition. *Team cognition: Understanding the factors that drive process and performance*, 235-248.
- Moon, J., Son, C., Sasangohar, F., Peres, S.C., & Neville, T.J. (2018, September 30 – October 05). *Modeling team cognition in emergency response via naturalistic observation of interactions*. Submitted to Proceedings of the 62nd Human Factors and Ergonomics Society (HFES) Annual Meeting. Philadelphia, Pennsylvania.