

Chapter 2

Study Questions and Research Methods

The questions addressed in this study are presented below along with the research methods employed in an effort to answer them. The study questions fall into two categories:

- Time-to-Task Completion: How long do certain tasks typically take to perform?
- Factors Influencing Mobilization Time: What other factors influence time-to-task performance?

2.1 Time-to-Task Completion

There are six primary mobilization time-to-task questions addressed in this study:

- I. *In a representative group of career or mostly career fire departments, what is the time actually spent completing alarm handling?*
- II. *How does actual recorded alarm handling data compare to the NFPA 1221 standard benchmarks?*
- III. *In a representative group of career or mostly career fire departments, what is the actual time typically required for turnout?*
- IV. *How does the actual recorded turnout time data compare to the NFPA 1710 standard benchmarks for turnout time?*
- V. *In a representative group of career or mostly career fire departments, what is the actual time typically required for mobilization?*
- VI. *How does the actual recorded turnout time data compare to an implied hypothetical NFPA standard benchmark for mobilization time?*

2.2 Factors Influencing Mobilization Time

In the standards making process, it is important to understand both the processes and the factors that influence them when functional performance objectives are established. Alarm handling and turnout have traditionally been addressed as separate processes with separate time objectives, but they are functionally connected by a critical communications link. Emergency call takers and dispatchers tasked with alarm handling must collect sufficient and accurate information to identify and alert the appropriate emergency response units (ERUs) for each call for emergency aid and then communicate that information in a clear, timely manner. The ERUs must receive and accurately interpret that information quickly in order to turnout efficiently without delays introduced by miscommunications or missed communications. ERUs must operate from an emergency response facility (ERF) designed to facilitate the receipt of those crucial communications and not hinder efficient turnout.

This study examined six specific factors influencing Mobilization Time:

- Combined PSAP/Communications Center Versus Separate Locations/Agencies
 - Does the introduction of a transfer between emergency call takers and dispatchers increase *alarm handling time*?
- Voice-Only Dispatch Versus Dispatch to Printer or Mobile Display Terminal (MDT)
 - Does the presence of clear written dispatch information improve *turnout time*?
- Fire Response Versus EMS Response
 - Does preparing for a fire response require a longer *turnout time* than for an EMS response?
- Daytime Versus Nighttime Response
 - Do nighttime turnouts require significantly more time than daytime turnouts?
- Firefighter Crew Proficiency in Baseline Turnout Exercise
 - Have we accurately assessed the time needed for turnout under ideal conditions?
- Effects of Station Layout on Turnout Response
 - How much does the size and layout of ERFs affect *turnout time*?

2.3 Research Methods

This study was able to share resources with the ongoing Department of Homeland Security funded “Multi-Phase Study on Firefighter Safety and Deployment of Resources” to develop a representative pool of prospective participants for the

collection of historical response data, baseline turnout exercise trials, and station information. The more than 400 agencies represented in that study were randomly selected using a statistical model to represent fire departments of various size throughout the United States, and a large pool of fire department demographic information was already being collected and was made available to this study.

A subset of the Firefighter Safety and Deployment sample population was asked to participate in this study based on the availability of communications center data documenting all four time segments making up the mobilization interval. Maintenance of that documentation is a requirement of the NFPA 1221 standard, and a significant number of suitable sample departments were expected to participate. In addition to gathering historical response data on mobilization, a survey was created to identify the effects of six specific factors potentially affecting variance in mobilization time.

- Combined PSAP/Communications Center Versus Separate Locations/Agencies
- Voice-Only Dispatch Versus Dispatch to Printer or MDT
- Fire Versus EMS Response
- Daytime Versus Nighttime Response
- Firefighter Crew Proficiency in Baseline Turnout Exercise
- Potential Effects of Station Layout on Turnout Response

The Mobilization Study was accomplished in five steps:

1. Selection of a representative cross-section of participant departments from the Firefighter Safety and Deployment sample sufficient to include at least 100 ERFs
2. Develop survey form in consultation with project technical advisors
 - 2.1. Information on PSAPs and communications centers
 - 2.2. Dispatch methods used/pertinent standard operating procedures
3. Data Collection
 - 3.1. Collection of survey form data
 - 3.2. Collection of one year of historical response data in electronic format
 - 3.3. Collection of Baseline Turnout Exercise data by FD representatives
 - 3.4. Collection of Station Information by FD representatives
 - 3.5. Field visits to selected departments to spot check documentation methods
4. Analysis of Historical Response Data
 - 4.1. Means, Standard Deviations, Cumulative Data Function Plots
 - 4.2. Alarm handling times by type of call and time of day
 - 4.3. Turnout times by type of call and time of day
 - 4.3.1. Identify factors creating variance and relative significance of each factor
 - 4.3.2. Correlate mobilization times with factors from survey data

4.3.3. Compare actual turnout time data with results from Baseline Turnout Exercise

5. Preparation of Reports

5.1. Final Report to Fire Protection Research Foundation

5.2. Summary Reports to NFPA 1221 and NFPA 1710 Technical Committees



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