I love data, and I love analyzing it. There is something poetic about exploring a set of numbers and allowing them to reveal the truth about a situation. That probably explains my interest in the book “Moneyball: The Art of Winning an Unfair Game” by Michael Lewis. He didn’t write the book to glorify the Oakland Athletics, or General Manager Billy Beane, for that matter, even though one might assume that after watching the movie “Moneyball” starring Brad Pitt as Beane. Rather, Lewis wrote the book to highlight a different way of thinking. It explores an organization using data and analytics to solve problems previously unexplored by an industry fixated on using outdated metrics to indicate success.

Analyzing baseball statistics is almost as popular as the sport itself. Stats enthusiasts/geeks (as they sometimes refer to themselves) evaluate every player based on performance—whether on the field or at the plate—and use that information to make predictions about the player, team and game. They believe that, over time, the data will reveal an accurate assessment of everyone involved. Unfortunately, the fire service does not lend itself to this type of analysis. We can hypothesize the potential for successful outcomes with individual performance standards and minimum company standards, but the ability to gather real-time data on those engaged in structural firefighting has yet to be quantified. As a result, the fire service is left reviewing historical data to glimpse what our future might hold. Although we should never base our fireground decisions solely on data, we can use this information to better guide our decision-making processes.

**Passion Project with a Purpose**

Project Mayday offers a reliable source of information that captures several aspects of our performance. What started as a way for Don and Bev Abbott to honor fallen Phoenix Firefighter Brett Tarver turned into a comprehensive study of mayday incidents, responses and prevention from fire departments across the country. Today, eight professionals, including physiologists, cardiologists, epidemiologists, psychologists, audiologists, statisticians, and other industry experts, along with a 24-member advisory board, collect, validate, collate and distribute the data gathered through Project Mayday.

The study has amassed an abundance of information. For example, if you visit www.projectmayday.net and click the links associated with career departments, you will access more than 700 total pages of data, representing less than 25 percent of total maydays. This article will highlight key findings and leave the rest to review at your leisure. In the next edition, we will review the data for volunteer departments.
Project Mayday has collected mayday reports from 12,851 career departments representing all 50 states between Jan. 1, 2015, and Dec. 31, 2021. The information includes 11,826 audio files from mayday radio traffic and 2,341 video recordings of mayday incidents affirming the reported data. Project mayday collects this data in three stages:
- Component 1 surveys department demographics.
- Component 2 gathers specific details related to the mayday event.
- Component 3 reviews the department’s response to the mayday’s aftermath.

Below, we examine department demographics, followed by the different types of maydays and the fireground response to the mayday.

**Demographics**

The overwhelming majority of structure fires in the study were residential; 85 percent occurred in single-family homes or multi-unit residential occupancies. Of these, 43 percent occurred in single-family homes.

All other occupancy types account for the remaining 15 percent of structure fires. Of these maydays, 41 percent occurred in commercial buildings, which comprise just a fraction of the remaining 15 percent of structure fires. The occurrence-to-mayday ratio in commercial buildings is disproportionately high.

According to the data, maydays occurred more frequently at particular times of day, with 78 percent happening between 9 pm and 9 am. However, the largest concentration (53 percent) occurred between midnight and 6 am.

The apparatus we ride to structure fires also bear out some compelling information. Engine companies accounted for 54 percent of the maydays, while ladder companies accounted for 45 percent. A firefighter might feel more comfortable when assigned to a ladder truck. However, ladder trucks comprise just about 10 percent of the entire U.S. fire service fleet, which means the mayday occurrence-to-apparatus ratio is higher in ladder trucks.

Arrival order provides some significant information. Data reveals that 57 percent of maydays involve the first unit on scene. The second-in unit is involved in 26 percent of the maydays, and the third-in company is involved 14 percent of the time. These correlations are intriguing, but the elapsed time on scene provides a little more insight. Thirteen percent of the maydays occurred when firefighters had been on scene between 15 and 20 minutes, and 62 percent of the remaining maydays happened within the next 20 minutes. That means 75 percent of maydays happened between the 15-minute mark and 40 minutes on scene. Shockingly, only 1 percent of the maydays happened in the first 10 minutes.

The study’s size-up and strategy-determination data tell a troubling story. On 70 percent of the incidents, the 360-degree size-up was either not done (49 percent) or was incomplete (21 percent). Even though there was little to no evaluation of critical fireground factors, crews operated in the offensive strategy 93 percent of the time. It is painfully clear the fire service defaults to the offensive strategy with negligible consideration for fireground conditions.

**Mayday Details**

The study documented quite a few different types of maydays. Some of the most intriguing data shows that

“There is a tendency to believe that since a certain practice has thus far not killed us, that it is an acceptable practice.”

*Senior Captain Johnny Peters, Houston Fire Department*
2,247 firefighters became lost or separated from the hoseline inside the IDLH and were forced to call a mayday; this happened on 18.3 percent of the fires and represented the largest number of maydays. Of these, 60 percent reported entering the structure without a hoseline and getting lost; the remaining 40 percent became separated from their hoseline while inside the structure. From a frequency standpoint, this occurred in commercial buildings (47 percent) more frequently than in residential occupancies (38 percent). Some of the most alarming information reveals that 86 percent of the participating departments had SOPs/SOGs that allowed firefighters to enter an IDLH without a hoseline.

Air-management issues are the second-highest category of maydays, occurring 16.1 percent of the time to approximately 1,982 firefighters. Low air alarms accounted for 47 percent of the maydays, and firefighters ran out of air 38 percent of the time. Once again, this happened in commercial occupancies (45 percent) more often than in residential structures (39 percent). However, 16 percent of the air-management maydays occurred in multi-unit residential occupancies, which tend to be much smaller in square footage than the other two categories.

A saddening number of maydays happened when firefighters fell into the basement through a hole in the floor or a floor collapse. This category’s most recent data saw a seven percent increase in maydays compared to numbers from 2015 through 2020. Firefighters had the floor collapse beneath them on 48 percent of the maydays, while 40 percent fell through a hole into the basement. Stairwell collapses represent a significant problem, occurring 24 percent of the time. One riveting side note: The data shows that 56 percent of these basement fires were controlled with a single handline.

Maydays involving entrapments and gas explosions also increased, climbing 3.2 and 4 percent, respectively. However, the number of firefighters falling off or through a roof dropped 3.6 percent compared to the 2015 through 2020 numbers. In 68 percent of these cases, the firefighters were just walking across the roof.

Cutting an inspection hole (28 percent) or a ventilation hole (25 percent) accounted for the next two largest categories. One note is that 75 percent of the time, there was only one firefighter on the roof at the time of collapse.

Communication problems remain a significant fireground issue, and having the radio on the wrong channel (25 percent) or completely turned off (20 percent) accounted for most of these problems. Seventy-one percent of the firefighters involved in a mayday did not know how to work the EA button, and 38 percent of the time, the initial mayday call was missed on the radio.

Data surrounding the mayday itself is quite compelling. Sixty-eight percent of the mayday events occurred with no functional accountability system in place. On 67 percent of the maydays, the incident commander did not work from inside a command post but instead operated from a sidewalk command position. This statistic might account for the high number of missed initial mayday transmissions, although these unheard calls do not fall exclusively at the IC’s feet; 29 percent of the time, the member transmitting the mayday did not identify their issue as an actual mayday. Instead, they indicated some other type of problem.

Fireground Response
The mayday rescue data is enlightening. The firefighter having the mayday self-rescued 48 percent of the time, and the crew of the mayday firefighter
Some of the most alarming information reveals that 86 percent of the participating departments had SOPs/SOGs that allowed firefighters to enter an IDLH without a hoseline.

facilitated the rescue 24 percent of the time. Other interior companies helped on 16 percent of the rescues. This means someone inside the IDLH at the time of the event rescued the distressed firefighter 88 percent of the time. IRIC/RIC/RIT/on-deck companies accounted for only 8 percent of the rescues; of these, 9 percent experienced their own mayday during the response. The inside-out rescue model for managing maydays clearly outpaces the once-popular outside-in model.

Equipment utilized during the mayday response also tells a fascinating story. Air-transfill equipment was used on 3,781 maydays, and 664 facepieces and 117 regulators were replaced. Stokes baskets were deployed on 2,563 maydays, and wire cutters were used on 2,549 incidents. On 52 percent of the maydays, the firefighter was treated on scene and returned to service. However, 31 percent of the mayday firefighters were taken to the hospital for observation, and 18 percent required hospitalization for more than 72 hours. Sadly, 12 percent of the firefighters became disabled, costing $39,350,000.

The following are the top 15 phrases heard right before the mayday. These communication cues indicate to everyone on the fireground that a mayday is imminent.

1. We have fire above our heads—86%
2. We have zero visibility—78%
3. We are running out of air—73%
4. We have not found the seat of the fire—66%
5. We have fire below us—56%
6. Have a hole in the floor or floor collapse—56%
7. We have a lot of sprinklers going off—54%
8. This is a hoarder house—49%
9. It’s getting really hot; we are backing out—41%
10. Sending a firefighter out with a problem—39%
11. We have a flashover—37%
12. We have a ceiling/roof collapse—35%
13. Need more line to reach the fire—30%
14. We have lost multiple windows—27%
15. Our exit is blocked—17%

We hope you enjoyed this review of Project Mayday. Join us in the next edition of B Shifter when we review the data for volunteer departments. 

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