2023 ESO FIRE INDEX

Insights and Best Practices for Fire Departments

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CONTEXT AND OVERVIEW FOR THE INDEX

Now in its fourth year, we have designed the Fire Service Index as a data tool and benchmarking guide to help you better understand opportunities, challenges, and victories in a variety of performance-related metrics in your own organization. High-quality data and proper analysis enable smarter planning and decision-making to improve community health and safety.

Ultimately, we are looking to help fire leaders ignite quality improvement conversations by exploring questions such as the following:

What are our most common response types overall? Among fire calls?

How many of our responses are EMS compared to fire?

For fire calls, what are the most common property types we respond to?

How much property loss was reported overall?

How quickly do we respond to a call on average?

How frequently are firefighters documenting decontamination procedures?

The appropriate metrics for evaluating the success of your fire department will vary depending upon a number of factors, including the size of the population served and geographic location. In some cases, the emphasis is less about identifying "success" and more about understanding your community and its unique needs. However, we believe an objective look at aggregate data across the United States can give you a good idea of how you are performing compared to your peers.

As stated earlier, the purpose of this Index is to serve as a point of reference for fire departments to identify which areas are in alignment and which areas represent opportunity for improvement – or at least further assessment and evaluation. This quantitative approach to measuring performance gives fire departments a starting framework to continually refine strategies, increase efficiency, improve outcomes, and allocate resources appropriately.

The 2023 ESO Fire Service Index report uses data compiled from 1,461 participating agencies and represents 4,527,591 incidents from January 1, 2022 – December 31, 2022. We hope you find this Fire Service Index report helpful, enlightening, and empowering.

1,461
AGENCIES

4,527,591
INCIDENTS

THIS MEASURE ONLY USES RECORDS WITH MUTUAL OR AUTOMATIC AID GIVEN
Types 3,4,5

253,073

GLOSSARY

Incident: Any situation in which emergency services organizations respond to deliver emergency services, including rescue, fire suppression, emergency medical care, special operations, and other forms of hazard control and mitigation.

Mutual Aid: Lending assistance across jurisdictional boundaries.

Automatic Aid: Assistance that is provided through a contractual agreement between agencies.

LIMITATIONS

This Index is retrospective and looks at aggregate data from January 1, 2022 – December 31, 2022. There are no universal rules designed around these trends. The purpose of the Index is to be informative and directional, but it is not intended to be a scientific study – nor is it intended to be comprehensive in nature. We hope this Index serves as a body of literature that adds to the discussion and conversation around best practices for each of the selected metrics to help improve community health and safety.

KEY METRICS

MOST COMMON INCIDENT TYPES

PERCENT OF EMS CALLS VS. FIRE CALLS

STRUCTURE FIRES

DOCUMENTATION OF TOTAL PROPERTY AND CONTENTS LOSS AND VALUE

FIRST APPARATUS TIMES

DECONTAMINATION

CRITICAL INCIDENTS

KEY FINDINGS

The 2023 ESO Fire Service Index report looked at 4,527,591 incidents from January 1, 2022 – December 31, 2022. At a macro level, the data revealed the following findings:

Residential properties accounted for 80% of all fire calls (100 series), in line with last year's numbers.

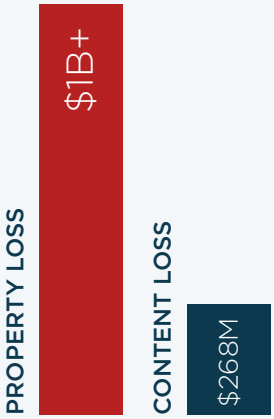
80%
2022

80%
2021

Fire departments continue to respond to more EMS calls than fire calls. Based on our data, we see that 300-series EMS incidents accounted for

68%

of all incidents, while 100-series Fire responses accounted for 3% of all calls.



Estimated property loss was

$1B+

with another

$268M

in estimated content loss.

31%
Series 110

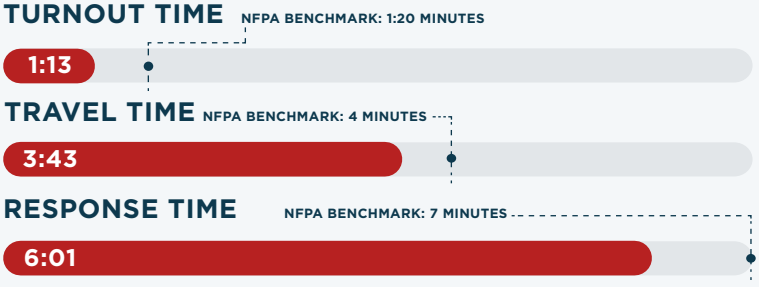
24%
Series 150

22%
Series 140

The most common types of fire responses include structure fire at 31% (Series 110), outside rubbish fire at 24% (Series 150), and natural vegetation fire at 22% (Series 140).

The value saved by the fire service was $4B+.

Median first apparatus turnout time, travel time, and response times are in alignment with NFPA benchmarks.



82%

OF INCIDENTS HAD AT LEAST ONE DECONTAMINATION PROCEDURE NOTED.

FIRE SERVICE INDEX

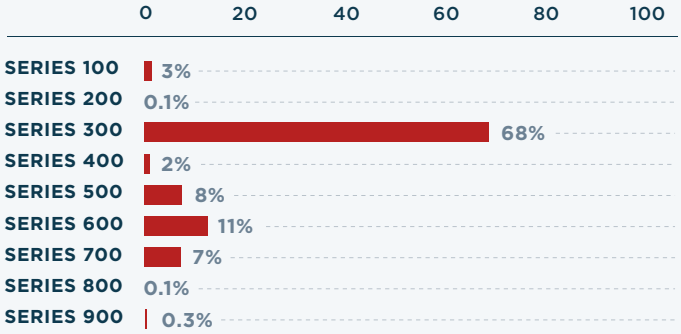
INCIDENT TYPES

Tracking the breakdown of incidents by type from year to year allows us to identify trends so fire departments can see how their most common incident types compare nationally.

Chart 1 shows the breakdown of all incident types. Overall, the data match what we saw in 2021, with a majority of incidents being EMS calls (Series 300).

Chart 1

TYPES OF INCIDENTS
N = 4,265,929



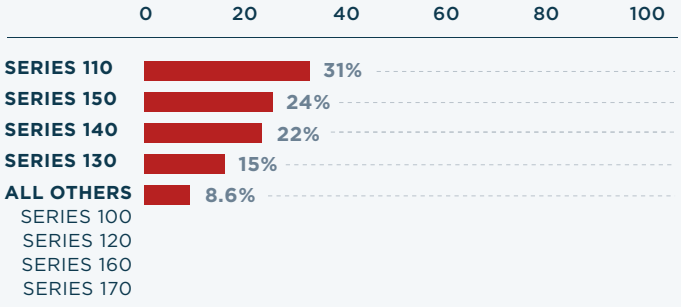
INCIDENT TYPES

SERIES 100: Fire
SERIES 200: Overpressure Rupture, Explosion, Overheat (No Fire)
SERIES 300: Rescue & EMS Incident
SERIES 400: Hazardous Condition (No Fire)
SERIES 500: Service Call
SERIES 600: Good Intent Call
SERIES 700: False Alarm & False Call
SERIES 800: Severe Weather & Natural Disaster
SERIES 900: Special Incident Type

When limited to fire incidents only (100 series), the data show the three most common fire response types are structure fire (Series 110 – 31%), outside rubbish fire (Series 150 – 24%), and natural vegetation fire (Series 140 – 22%). Vehicle fires (Series 130) came in fourth at 15%. Chart 2 shows the breakdown of categories of fire-specific incident types (Series 100).

Chart 2

TYPES OF FIRE RESPONSES



FIRE RESPONSES

SERIES 100: Fire, Other
SERIES 110: Structure Fire
SERIES 120: Fire in Mobile Property Used as a Fixed Structure
SERIES 130: Mobile Property (Vehicle) Fire
SERIES 140: Natural Vegetation Fire
SERIES 150: Outside Rubbish Fire
SERIES 160: Special Outside Fire
SERIES 170: Cultivated Vegetation, Crop Fire

INCIDENT TYPES

RECOMMENDED ACTION

An interesting finding in the 2022 data is that natural vegetation fire continues to be the third most common type of fire call. This may be due, in part, to changing weather patterns, which have resulted in longer wildfire seasons, greater wildfire frequency, and larger wildfire burn areas.

Although wildfires do not impact all communities equally, nearly 45 million homes and 72,000 communities are at risk of being affected by a wildfire. Whether your fire department directly serves areas that are regularly impacted by wildfires, or whether your department provides mutual or automatic aid to a fire department that manages wildfires, it is important to be up-to-date on wildland fire best practices. The International Association of Fire Chiefs (IAFC) and the US Forest Service offer an extensive toolkit of resources for wildland fire prevention and management.

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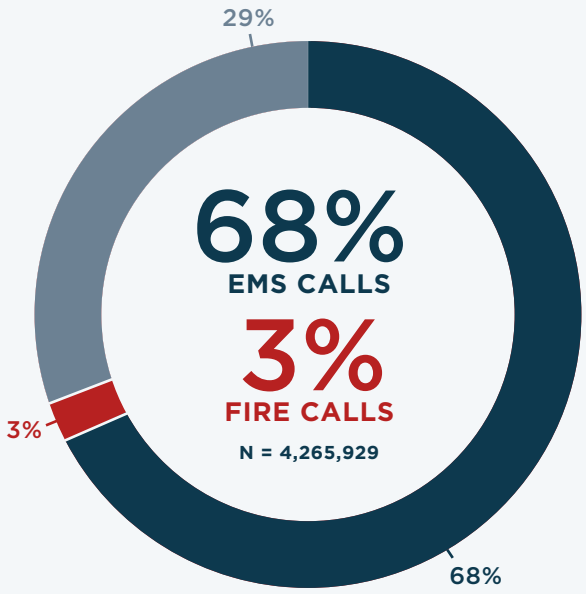
EMS VS. FIRE CALLS

The number of EMS incidents is a trend that has been monitored for some time. With the advent of new, more fire-resistant building materials – as well as an increase in community risk reduction programs – fire calls have been decreasing overall. Additionally, the emergence of COVID-19 created a need for more community response and engagement. As a result, the fire service has predominantly become involved in EMS on some level, whether it be first response by trained EMS personnel, or ambulance transport.

In our data, we see that 68% of all incidents were EMS calls (Series 300), which is consistent with what we saw in the 2022 Fire Service Index. About 3% of incidents were fire-based incidents (Series 100), which is a small increase in the number of fire incidents that we saw in the 2022 Fire Services Index (2%). Chart 3 shows the breakdown of EMS vs. fire incidents in relation to all incident types.

Chart 3 **EMS-BASED INCIDENTS VS. FIRE-BASED INCIDENTS**



TYPE OF INCIDENTS

- 68% **SERIES 300:** RESCUE & EMS INCIDENT
- 3% **SERIES 100:** FIRE
- 29% ALL OTHER INCIDENTS

RECOMMENDED ACTION

If your department doesn't currently engage with community partners, use the opportunity to collaborate more closely on community risk reduction. Partners like public health organizations, hospitals, private or third-party EMS, and alternative transport programs can provide much broader engagement to help improve the health and safety of a community.

Since many fire departments provide EMS activities, focus on diverting non-emergent call volumes to alternative resources with community health paramedic programs, nurse triage lines for referrals, and increased risk reduction programs that could help decrease EMS call volume. Examples of these types of programs include slip, trip, and fall prevention; community health/wellness education; and community partnerships for mental health, medication assistance, and home food delivery for patients who have difficulty leaving their homes. Risk reduction programs focused on opioid overdose prevention may help some communities stay safer as well.

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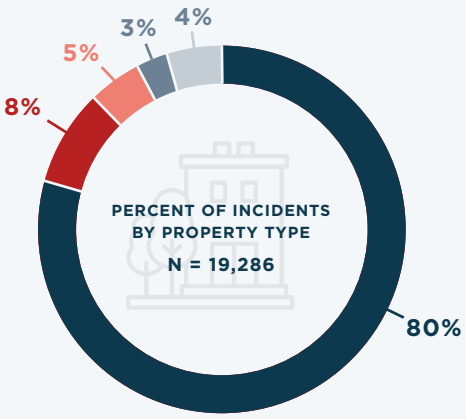
PROPERTY TYPES

Residential properties (one or two-family units and multifamily units) account for 80% of all fire calls (Series 100). This is similar to the findings in the 2022 Fire Service Index, which showed residential properties as accounting for 80% of all fire calls.

Chart 4 shows the top five most common property types responded to by fire departments for 100-series calls. Chart 5 shows the breakdown of residential property types.

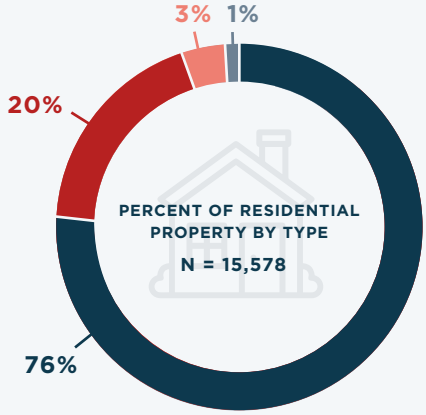
Chart 4 **PROPERTY USE AMONG 111 (BUILDING FIRE) INCIDENTS**



PERCENT OF INCIDENTS BY TYPE

- 80% 4XX
- 8% 8XX
- 5% 5XX
- 3% 1XX
- 4% ALL OTHER TYPES (2XX, 3XX, 6XX, 7XX, 9XX)

Chart 5 **MOST COMMON RESIDENTIAL PROPERTY USE**



PERCENT OF RESIDENTIAL PROPERTY BY TYPE

- 76% 419
- 20% 429
- 3% 400
- 1% ALL OTHER TYPES (439, 449, 459, 460, 462, 464)

PROPERTY USE CODES FOR 111 (BUILDING FIRE) INCIDENTS

- **1XX:** Assembly
- **2XX:** Educational
- **3XX:** Healthcare, detention, and correction
- **4XX:** Residential
- **5XX:** Mercantile, business
- **6XX:** Industrial, utility, defense, agriculture, mining
- **7XX:** Manufacturing, processing
- **8XX:** Storage
- **9XX:** Outside or special property

RESIDENTIAL PROPERTY USE CODES

- **400:** Residential, other
- **419:** 1 or 2 family dwelling
- **429:** Multifamily dwelling
- **439:** Boarding/rooming house, residential hotels
- **449:** Hotel/motel, commercial
- **459:** Resiential board and care
- **460:** Dormitory-type residence, other
- **462:** Sorority house, fraternity house
- **464:** Barracks, dormitory

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PROPERTY TYPES

RECOMMENDED ACTION

Post-pandemic life has revealed fundamental changes to the world. For example, an increase in remote and hybrid work means that people are home more often than they were pre-pandemic, which increases residential fire risk. Focus community risk reduction efforts on educating the public about home fire prevention initiatives like smoke detector programs, home evacuation programs, home fire extinguishers, and ensuring residents adequately mark their address so the homes are easy to find at night or in sight-hindering conditions.

Additional residential fire safety education could include cooking safety as meals continue to be cooked at home, electrical safety as people continue to work from home, and how to safely extinguish and dispose of cigarette butts and firewood ash. The National Fire Protection Association (NFPA) offers several educational resources that are specific to educating an audience that is spending more time at home. As an additional safety measure, fire departments should evaluate the value of home sprinklers in code adoption and updates to help decrease fire damage and increase survivability.

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PROPERTY & CONTENTS: LOSS & VALUE

With residential fires accounting for such a large proportion of all fire calls in 2022, we took a closer look at property and contents loss and value for building fires (111s) with residential property use codes (4XX).

The total estimated property loss reported among residential building fire calls during 2022 was more than one billion dollars, with another estimated 270 million dollars in estimated content loss. Chart 6 displays the total estimated property and contents loss and value among building fire responses (111s) with residential property use codes (4XX).

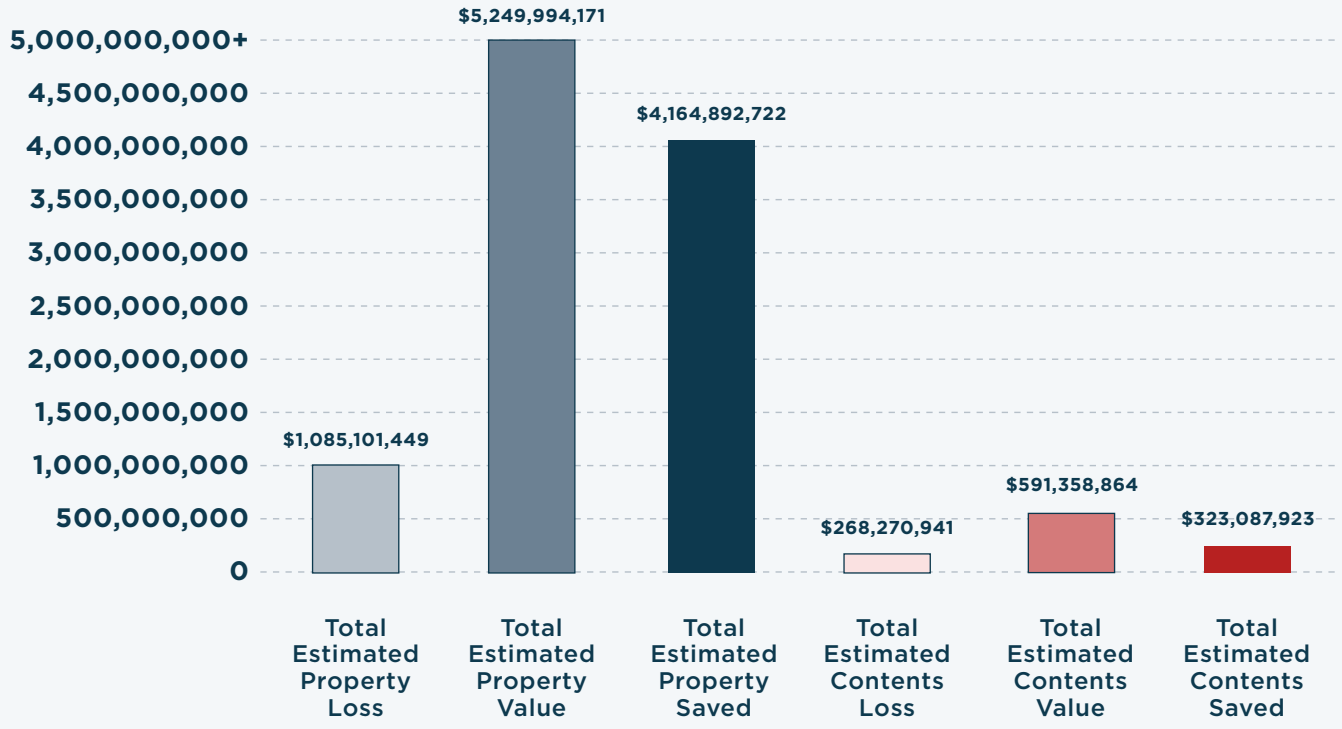
Our analysis also shows a significant difference between the total estimated property loss and the total estimated property value (by almost 5X), **indicating that property loss may not be consistently recorded.**

Chart 7 shows the rate of documentation of property and content loss. We see opportunity for improvement in documentation, with 18% of property loss documentation and 27% of content loss documentation indicating “null” or “zero.” Complete and accurate documentation is essential to assessing the full impact of a fire.

Chart 6

PROPERTY & CONTENTS LOSS & VALUE
BUILDING FIRES WITH RESIDENTIAL USE PROPERTY CODES

N = 15,561



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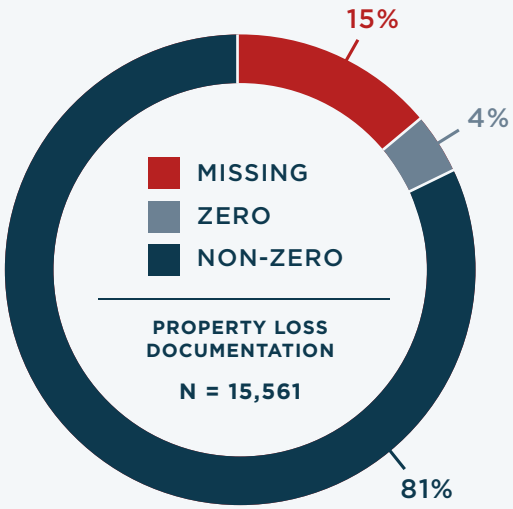
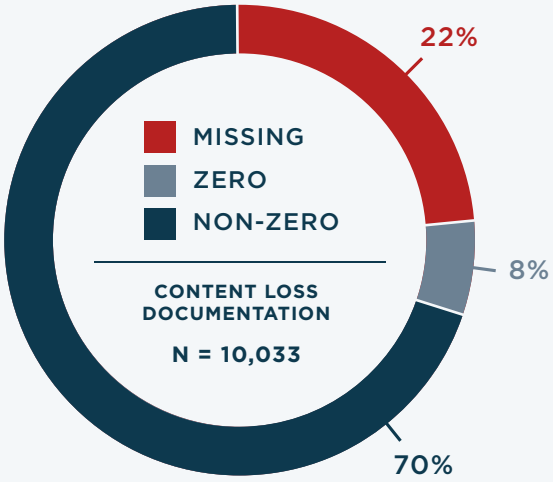
PROPERTY & CONTENTS: LOSS & VALUE

Chart 7

PROPERTY & CONTENTS LOSS DOCUMENTATION: BUILDING FIRES WITH RESIDENTIAL USE PROPERTY CODES





RECOMMENDED ACTION

Documenting the estimated value of property and contents lost in a fire offers many benefits to fire departments, including serving as an indicator of the severity of the incident and serving as a benchmark for progress in fire protection. Additionally, showing loss compared to total value of a property creates an opportunity to highlight the impact of the fire department's efforts in the community.

The ability to report the amount saved to the community helps show the value of the fire department and the associated value they are in place to protect.

Property values can be calculated using NFPA recommended calculation steps, or via local tax assessor web sites. The U.S. Fire Administration (USFA) recommends using the International Code Council (ICC) Building Valuation Data (BVD) formula to help fire departments determine dollar loss on fires. The BVD provides the "average" construction cost per square foot.

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FIRST APPARATUS TIMES

In fire and EMS, the time it takes to respond to calls can be crucial to the resolution of an incident. Time can add context to a fire department's overall performance, but it should not be the only measure considered when analyzing performance. Considering other metrics, such as lights and sirens use, can also contribute to performance and how safely a fire department is operating in the community.

In Charts 8 and 9, we identify the median and 90th percentile times for a range of metrics related to response time for both fire (Series 100) and EMS (Series 300) calls. For fire and EMS responses, the NFPA has set guidelines of a 4-minute or less travel time, 80 seconds for fire turnout time, and 60 seconds for EMS turnout time. **For response time, the median travel time for both fire and EMS fell at or below the guideline. Median turnout time for both fire and EMS is slightly higher than the recommended times.**

GLOSSARY

Alarm handling: Public safety answering point (PSAP) time to alarm time.

Dispatch time: Alarm time to dispatch time.

Turnout time: Dispatch time to enroute time.

Travel time: Enroute time to on-scene time.

Response time: Alarm time to on-scene time.

Time to first record lock: Last unit clear to first lock.

Chart 8 **FIRST APPARATUS ON SCENE TIME BREAKDOWNS (FIRE)**

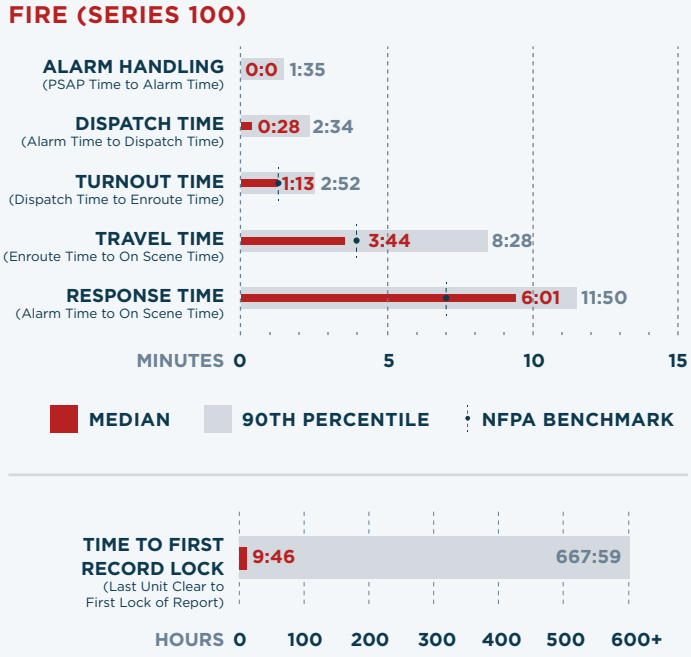
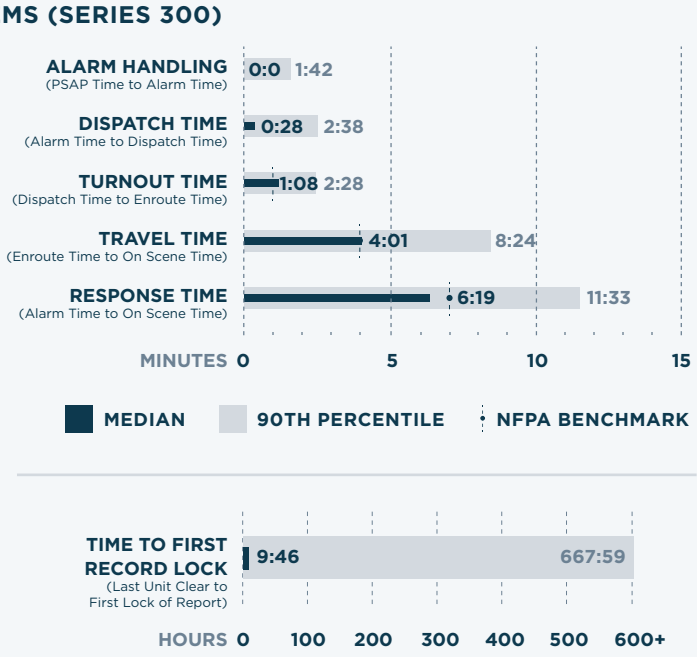


Chart 9 **FIRST APPARATUS ON SCENE TIME BREAKDOWNS (EMS)**



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FIRST APPARATUS TIMES

RECOMMENDED ACTION

Your crews take swift action with each call. However, in the rush of acting as quickly as possible, they may not always know or track exactly how long they are taking for turnout. Adding timers with a notification system showing turnout time as crews are headed to the truck can enable easy time tracking. Sharing these turnout times with each crew monthly will provide important, actionable feedback related to their performance.

When tracking travel time and setting goals for your department, take your unique practice setting into account. The NFPA 1710 standard was designed primarily for communities with career or paid firefighters, whereas the NFPA 1720 standard was designed for communities with volunteer firefighters. Use these standards, your own data, and collaborate with community leaders to establish appropriate baselines and benchmarks. Then report on your performance to both internal and external stakeholders.

Completing reports quickly after the units are clear can help maintain the accuracy and timeliness of information. This, in turn, ensures that any important notes that could benefit another responder or shift in the same location are entered into the system on time.

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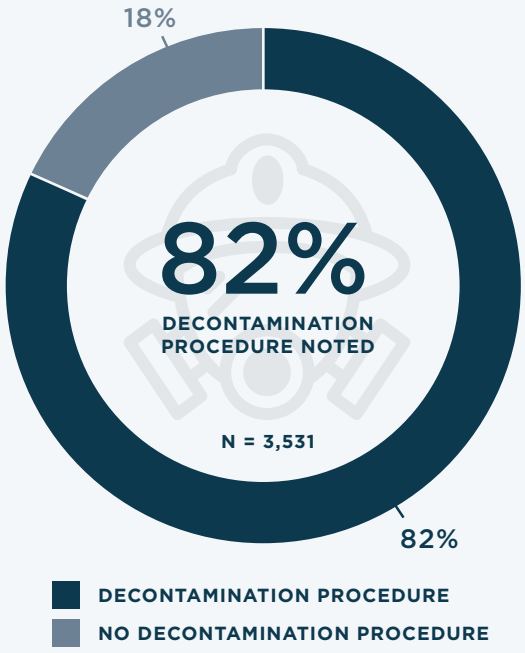
DECONTAMINATION

Firefighters face many health and safety risks in their work, and one of the most notable long-term risks is cancer. A multi-year study by the National Institute for Occupational Safety and Health (NIOSH) found that firefighters had a 9% increase in cancer diagnoses and a 14% increase in cancer-related deaths over the U.S. population.

An essential part of mitigating cancer risk in firefighters is using proper PPE at each incident and throughout out the incident. Also, cleaning methods like wet-soap decontamination and commercial wipes are effective ways to remove contaminants. Documenting decontamination procedures is an important part of firefighter safety because it provides an overview of which crew members have experienced more exposures and which may require additional healthcare monitoring and increased testing/screening for early cancer detection, if present.

Chart 9

DECONTAMINATION FOR FIREFIGHTER AFTER A WORKING FIRE (111 INCIDENT TYPE)



RECOMMENDED ACTION

One of the best ways to reduce the risk of cancer in the fire service is to educate and train your crews on decontamination procedures from day one. Provide your crews with frequent training and education, as well as annual physicals and cancer screenings.

Tracking and documenting exposures also benefits the health and safety of firefighters, but it is only one part of the equation. Data must be analyzed and interpreted to fully understand the risks that firefighters face and develop best practices to help mitigate risk. On an industry-wide level, sharing health and exposure data with employers and organizations like the National Firefighter Registry can assist researchers studying the correlation between certain illnesses and exposures.

These data can also help form industry best practices, legislation and guidelines, and even make improvements in manufacturing of firefighting equipment, suppression tools, and construction materials.

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CRITICAL INCIDENTS

There is increased awareness around the physical and mental well-being of emergency personnel as evidenced by multiple studies on a variety of related topics, including burnout.

With this measure we focus on firefighter exposure to critical incidents as a key factor related to mental well-being.

The critical incident component in ESO Fire Incidents allows reporting of 9 circumstances collectively representing potentially psychologically traumatizing events:

- Serious injury or line of duty death
- Suicide of a co-worker
- Death or serious injury to a child
- Prolonged failed rescue
- Multi-casualty incident disaster
- Victim is known to the responder
- Any incident where personal safety of the responder is jeopardized
- Incidents with excessive media interest, and
- Any incident with an unusually strong emotional component.

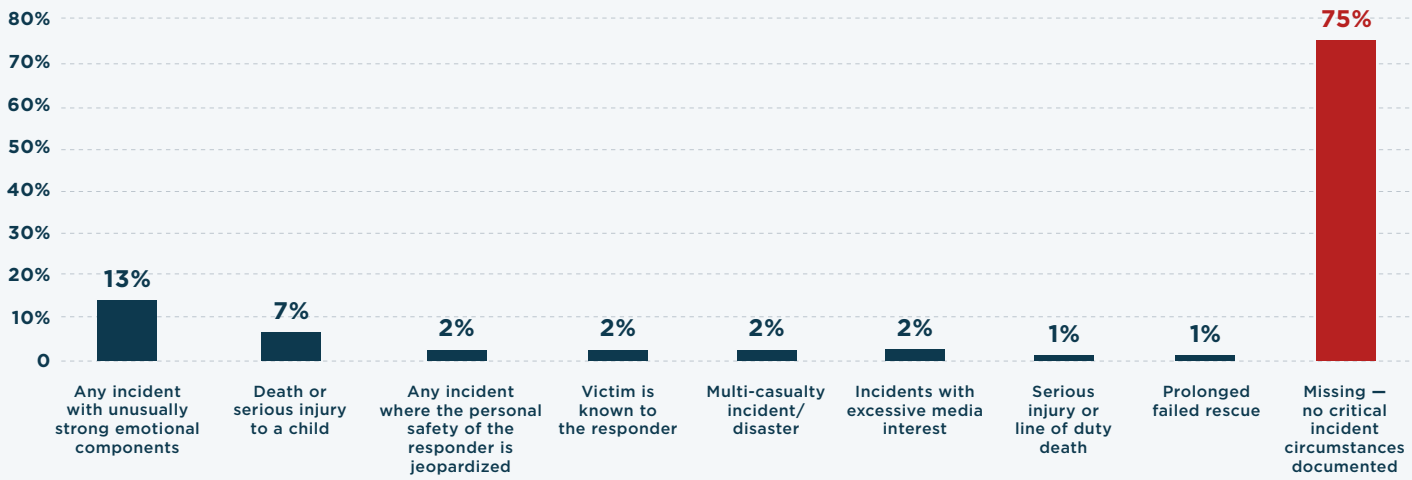
As of 2022, the suicide rate for firefighters is 18 out of 100,000 (compared to 13 out of 100,000 for the general population), according to the Ruderman White Paper Update on Firefighter Mental Health and Wellness. According to studies by IAFF, 5% of all firefighters have attempted suicide. Approximately 22% of fire service members are expected to experience PTSD at some point in their career. Many of those firefighters who experienced PTSD and received assistance and support during the treatment returned to work successfully. Exposure to critical incidents is closely linked to PTSD and suicide.

Importantly, there is no set list of criteria that makes an incident critical, but rather an exposure results from an individual's response to a set of circumstances. The term psychologically traumatizing event (PTE) is also used to recognize this distinction.

Chart 10 below looks at the most common circumstances related to critical incidents recorded by firefighters. However, there is a major opportunity for greater documentation of critical incidents as 75% of the records did not include documentation of the circumstances surrounding the critical incident.

Chart 10

CRITICAL INCIDENTS
TOTAL CRITICAL INCIDENTS: 2,414
TOTAL CRITICAL INCIDENTS WITH CRITICAL INCIDENT TEAM MOBILIZED: 237



RECOMMENDED ACTION

Every person will react differently to the same or similar incidents, so it's important to make sure your department openly accepts the importance of mental health and discusses mental health needs.

Educating about mental health empowers firefighters and those around them to recognize a need and know how to reach out. Training can include signs and symptoms of PTSD and stress disorders, resources that are available, and signs of drug or alcohol addiction. Share important contact numbers to all members, such as the National Suicide Prevention Lifeline (1-800-273-TALK [8255]). Online resources for those seeking help, those wanting to help, and those managing team members is available at www.pocketpeer.org.

Make sure your agency has access to Peer Support programs, training, and mental health professionals who are trained and equipped to work with firefighters.

Most importantly, recognize the role that interpersonal work relationships play as stressors and that these are shaped by interactions with supervisors, management, and administration as well as co-workers. Make sure your service's organizational procedures, including clear policies regarding bullying and harassment, are in place to promote a positive atmosphere of respect, fairness, and employee appreciation.

METHODOLOGY

The dataset for the 2023 ESO Fire Service Index report is real-world data, compiled and aggregated from 4,527,591 incidents from fire departments across the United States that use ESO's products and services. Incidents occurred between January 1, 2022 and December 31, 2022.

OK, NOW WHAT?

Organizations should use this information to understand why metrics are important and which metrics and drivers can have the biggest impact on your department and the communities you serve.

With this Index as a foundation, you can perform your own analysis to serve as the basis for other performance measures and outcomes. The metrics shown in this study are by no means exhaustive. Every department is unique and has its own strengths, structure, and goals. Because of these attributes, results achieved by one organization may not be attainable by another for a variety of reasons. However, these metrics should provide a foundation to compare your measurements and outcomes to what we are seeing nationally.

ESO'S MISSION

ESO's mission is to improve community health and safety through the power of data. That is why we produce our suite of Indices—the Fire Service Index, the EMS Index, and the Trauma Index—annually. Our mission drives which metrics we analyze, whether tied to quality and process improvement, community health, or provider safety. We make the Indices publicly available at no cost because we believe it is the right thing to do to not only fulfill our mission, but to help improve the industries that we serve.

ABOUT ESO

ESO (ESO Solutions, Inc.) is dedicated to improving community health and safety through the power of data. Since its founding in 2004, the company continues to pioneer innovative, user-friendly software to meet the changing needs of today's EMS agencies, fire departments, hospitals, and state EMS offices. ESO currently serves thousands of customers throughout North America with a broad software portfolio, including the industry-leading ESO Electronic Health Record (EHR), the next generation ePCR; ESO Health Data Exchange (HDE), the first-of-its-kind healthcare interoperability platform; ESO Fire RMS, the modern fire Record Management System; ESO Patient Registry (trauma, burn and stroke registry software); and ESO State Repository. ESO is headquartered in Austin, Texas. For more information, visit www.eso.com.

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