



Emergency Vehicle Supply and Demand

Fire Service Apparatus Supply, Specification, and Manufacturing Analysis

An in-depth evaluation of trends, challenges, and implications of fire service Apparatus management



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Introduction

Fire and emergency services organizations face unprecedented challenges in securing emergency apparatus, threatening operational readiness, and financial stability. Stakeholders continue to press fire chiefs with urgent questions:

- Why are delivery timelines so lengthy?
- What drives the unpredictable pricing?
- When will the situation return to normal?

Until now, no authoritative source has provided clear answers.

The **International Association of Fire Chiefs (IAFC) - Emergency Vehicle Management Section (EVMS)** formed the Emergency Vehicle Supply and Demand Work Group to address these critical issues. This collaborative initiative also brings together the **Metropolitan Fire Chiefs Association**, the **Wisconsin State Fire Chiefs Association**, and the **Fire Apparatus Manufacturers Association (FAMA)**. The Work Group seeks to confront these complex problems head-on by combining national, local, and industry expertise.

The Work Group was formed in response to mounting concerns across the fire service regarding extended delays and escalating costs in emergency apparatus procurement. These challenges place intense pressure on municipal budgets, disrupt essential replacement cycles, and, in some cases, may jeopardize the delivery of emergency services.

With a focus on actionable solutions, the Work Group is committed to the following objectives:

- Identify root causes of procurement delays and rising costs
- Analyze historical and emerging trends affecting apparatus availability
- Deliver clear, evidence-based recommendations to mitigate adverse impacts

- Equip agencies with tools for sustainable apparatus planning
- Provide policy guidance to support informed decisions at local, regional, and national levels

This report serves as a vital resource for fire service leaders. It clarifies a volatile procurement environment and outlines a practical path forward, grounded in data, industry insight, and cross-sector collaboration. This initiative addresses today's challenges and builds a foundation for a more resilient, strategic, and sustainable future in fire and emergency apparatus procurement.

Purpose Statement

The Emergency Vehicle Supply & Demand Work Group purpose is to:

- Create a cross-collaborative work group of fire service stakeholders and emergency apparatus manufacturers to address apparatus supply and demand problems/issues.
 - Present the fire service with the background and current situation for the emergency apparatus supply and demand challenges.
 - Develop a powerful document and educate the fire and emergency services agencies on emergency apparatus planning and purchasing for the future.
 - Create sustainable strategies for the fire and emergency services agencies on emergency apparatus planning and purchasing for the future.
 - Educate and empower fire and emergency services agencies on emergency apparatus planning and purchasing for a sustainable future.
 - Create and maintain a collaborative forum to mitigate adverse impacts, with specific action items, on emergency apparatus cost and supply and demand.

Executive Summary

The Issue

Fire departments across the country can no longer buy fire engines and ambulances on time or at predictable cost. Delivery times that once took 8–18 months now stretch **three to four years**.

Purchase prices have continued to increase. This is not an inconvenience—it is a public safety risk.

Why It Matters

Fire and EMS apparatus are frontline public-safety infrastructure. When departments don't have reliable apparatus:

- Communities might wait longer for emergency response
- Departments keep potentially unsafe, unreliable, end-of-life apparatus in service
- Mutual aid and new fire station openings are delayed or impossible

In short: **slower response and higher risk.**

What Caused the Problem

This condition is the result of a perfect storm:

- **COVID-19 shutdowns** reduced manufacturing capacity and skilled labor
- **Supply chain shortages** (chassis, microchips, wiring, engines, transmissions, axles) hit small specialty manufacturers hardest
- **EPA engine transition timelines** triggered a surge of early orders and contributed to escalating component pricing

- **Federal COVID relief funds** accelerated demand faster than industry capacity
- Orders now exceed manufacturing capacity by roughly **70%**, while shipments remain below historical averages.
- The fire service accounts for only a fraction of the overall trucking industry served by engine, transmission, and chassis manufacturers. Because fire apparatus production represents a low-volume, highly customized market relative to commercial trucking, fire service procurement is inherently less influential in shaping manufacturing priorities, production schedules, and supply chain allocation within the sector.

The fire apparatus industry is small, highly specialized, and largely hand-built. The fire apparatus industry cannot surge production overnight.

What Fire Departments Can Do

Departments are adapting, but options to address long construction time and escalating costs are limited:

- Buying less-customized “stock” apparatus when available
- Extending apparatus life through maintenance and refurbishment
- Doing regional or group purchasing
- Provide advanced driver operator training to teach wear and tear reduction methods.
Consider using a driver simulator.
- Consider ways to reduce mileage per year

- Delaying fleet replacement beyond recommended safety standards if the safety levels of the apparatus are deemed safe for operational use, others are pursuing earlier purchases anticipating longer construction times
- Evaluate finance and budgeting options that anticipate increasing costs
- Reducing or eliminating “nice to have” (optional) specifications, preserving “must have” (requirements) specifications
- Provide a charter to the apparatus procurement committee that establishes the leader’s intent for specifications, taking into account cost-effectiveness, contributions to reliability, and requirements for reduced maintenance costs.
- Maintain a reliable recommended reserve fleet

These are stopgaps, not solutions.

What Congress Can Do

Congress has practical, targeted ways to help restore balance and protect public safety:

1. Expand Grant Flexibility

- Allow AFG funds to be used for apparatus refurbishment
- Allow SAFER funds to hire and train Emergency Vehicle Technicians (EVTs)

2. Sustain Core Fire Grants

- Maintain strong funding for AFG and SAFER as apparatus costs rise

3. Strengthen Manufacturing Capacity

- Incentivize capital investment and workforce retention and training for apparatus manufacturers
- Encourage reserve production capacity to handle demand surges

4. Stabilize the Supply Chain

- Prioritize delivery of critical components (chassis, engines, semiconductors) for fire and EMS apparatus.

5. Promote Standardized Apparatus

- Support development of voluntary, standardized fire apparatus models to reduce cost and delivery time
- Leverage federal grant policy to drive adoption of voluntary standardized fire apparatus designs, where operationally appropriate reducing cost, complexity, and delivery delays while improving manufacturing efficiency and supply chain resilience.

Bottom Line

Fire departments are doing more with less—but they cannot respond without safe, reliable apparatus. This crisis threatens emergency response nationwide. With targeted action, Congress can help stabilize the market, shorten delivery times, and ensure that when citizens call 9-1-1, help arrives fast and safely.

Purchase orders and construction completion is beginning to show signs of stabilizing as the purchasing surge is lowering and construction capacity is increasing. The rate of cost increases is

difficult to forecast, necessitating the fire service to deploy cost management strategies, some of which are presented in this White Paper.

Current Conditions (Background and Significance)

Fire Apparatus Manufacturing: The Pre and Post COVID Landscape

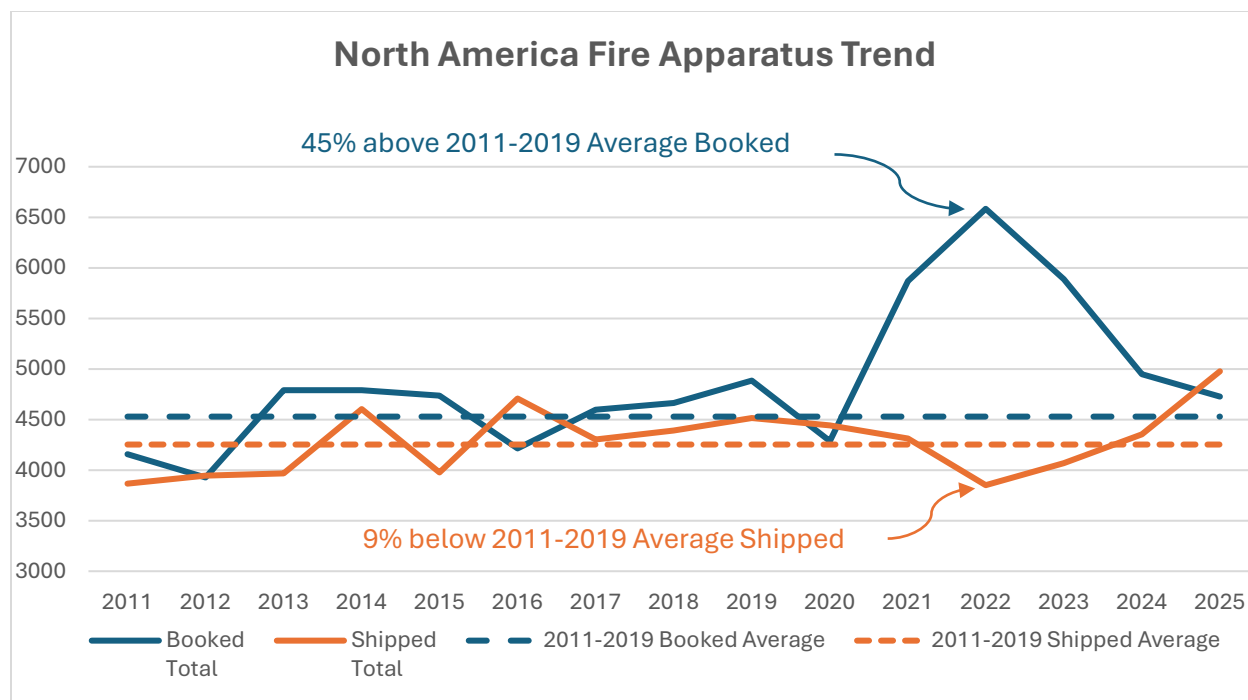
From 2011 to 2019, the fire apparatus manufacturing industry experienced a period of relative stability. During these years, production and purchasing trends were consistent, and lead times were predictable. Pumpers typically required eight to twelve months to produce, aerial units ranged from twelve to eighteen months, and specialty units often took eighteen to twenty-four months. This consistency provided fire departments with reliable planning cycles and manufacturers with steady production flows.

The onset of the COVID-19 pandemic in 2020 disrupted this equilibrium. Travel restrictions and the inability of specification committees to meet in person led to a drop in booked orders for fire apparatus. Interestingly, production increased slightly that year, creating a temporary imbalance between supply and demand. As restrictions eased in 2021 and 2022, pent-up demand surged, with new apparatus orders spiking to 45% above the pre-pandemic baseline. Manufacturers, anticipating material shortages, had increased inventories early on, which helped mitigate some of the initial disruption. However, by 2021 and 2022, shortages of critical components such as electrical connectors, axles, brakes, emission systems, commercial chassis, and microchips became more severe. Vendors serving both the automotive and fire apparatus industries prioritized larger clients such as large companies providing over-the-road transportation and shipping, further compounding delays for fire apparatus manufacturers.

This supply chain strain coincided with growing regulatory pressure. In early 2022, engine manufacturers announced changes to meet the Environmental Protection Agency's 2027 emission standards, with the industry's primary engine supplier targeted an implementation date of January 1, 2026. Although the financial implications were not fully known, the anticipated cost increases and limited production capacity prompted fire departments to rush orders in an effort to secure build slots before the new regulations took effect.

Further compounding this "perfect storm" was the significant influx of the American Rescue Plan Act of 2021 (ARPA), the Coronavirus Aid, Relief, and Economic Security Act (CARES), and other grant dollars. This surge in funding exacerbated demand and dramatically extended lead times.

Despite these challenges, production capacity remained relatively flat, declining only about one percent annually post-COVID, and falling to its lowest point of nine percent below the pre-pandemic average in 2022. Meanwhile, orders surged by an average of twenty-two percent annually compared to pre-COVID levels. In 2022, sales exceeded production capacity by 71%, further stretching an already significant backlog. By 2024, shipped orders had increased by 13% compared to the lows of 2022, signaling a slow recovery. Nevertheless, the gap between booked and shipped orders remains substantial. This imbalance has resulted in the extended lead times and delivery delays that are expected to persist for years.



The graph provided by the Fire Apparatus Manufacturers’ Association (FAMA) illustrates these trends clearly. From 2011 to 2019, booked and shipped orders tracked closely along stable baselines. The disruption in 2020 caused a sharp decline in booked orders, followed by a dramatic spike in 2021 and 2022. The resulting backlog is unprecedented in the industry’s recent history.

Looking ahead, the fire apparatus industry faces a slow path for supply to demand normalization. Manufacturers are strategically expanding production capacity, balancing growth with the need to avoid overstaffing and future layoffs. Although apparatus sales have fallen below annual production levels, the existing backlog is expected to take years to clear. In response, the industry is aggressively advancing production capabilities, adding new production lines, accelerating the proficiency of construction technicians, and deploying advanced technologies such as robotics to drive efficiency and throughput. At the same time,

manufacturers must continue adapting to regulatory changes, supply chain pressures, and evolving market demands.

Historical data suggests that while the industry experiences cyclical peaks and troughs, it tends to balance over time. The current surge in demand is part of this natural ebb and flow, and with continued collaboration and innovation, the fire apparatus sector is poised to recover.

While the fire apparatus industry has historically managed periods of fluctuating demand, current conditions differ markedly from past cycles. The convergence of supply chain disruptions, constrained manufacturing capacity, workforce shortages, and rising costs has created a sustained imbalance that exceeds normal market variation.

Absent targeted intervention, these pressures are unlikely to self-correct, underscoring the need for coordinated action among manufacturers, fire service leaders, and policymakers.

Custom fire apparatus now often requires thirty-six months or more for delivery, significantly longer than pre-COVID averages. In response, some manufacturers have begun offering standardized, non-custom units for short duration or even immediate delivery to help departments meet urgent needs.

Overall Market Conditions and Trends

Key Factors Contributing to the Current Situation

Several factors have contributed to the current state of the fire apparatus manufacturing industry:

- **Supply Chain Disruptions:** Ongoing issues with obtaining necessary components.
- **Regulatory Changes:** The announcement of upcoming 2027 engine emission standards has caused a rush to purchase before the new regulations take effect.
- **Market Dynamics:** Increased demand due to replacement cycles and cost concerns.

Statistical Analysis

When analyzing the data, it becomes clear that the production capacity has remained relatively stable. The industry saw a temporary decline in production post-COVID, but this has since recovered and increased capacities in 2024. The significant surge in orders post-COVID has created a backlog, which the industry is gradually addressing.

The data presented only spans approximately 2011–2025. Referencing 25–30-year trends is unsupported and risks minimizing the severity of the current crisis.

- **Production Capacity:** The production capacity remained stable pre-COVID, saw a slight decline post-COVID, but has since recovered and increased.
- **Order Surge:** There was a significant increase in orders post-COVID, with a notable peak in demand.
- **Backlog:** The surge in orders has resulted in extended lead times, creating a backlog that the industry is working to address.

When examining the broader historical picture over the past twenty-five to thirty years, the data reveals consistent trends. Despite fluctuations in production and order cycles, the overall pattern tends to balance out to a relatively stable level for fire apparatus. The industry has experienced various ups and downs, but these cycles generally even out over time.

Currently, we are witnessing one of those peaks in the buying cycle, which is impacting the fire service today. This is a typical occurrence within the industry, and while it presents challenges, it is part of the natural ebb and flow of fire apparatus manufacturing and purchasing trends.

Urban Fire Forum Advocacy for a National Fire Apparatus Specification

In September 2025, the Urban Fire Forum released its position paper titled, Support for the Establishment of a National Fire Apparatus Specification (NFAS), calling for a fire service–led response to the growing fire apparatus procurement crisis. The NFAS is envisioned as a nationally coordinated framework developed by major fire service organizations that promotes standardization where it adds operational and fiscal value, while preserving the flexibility necessary to meet local mission-critical requirements. This approach acknowledges that not every apparatus needs to be fully customized to deliver effective service, and that strategic, intentional standardization can significantly improve affordability, delivery timelines, transparency, and system-wide efficiency.

A pillar of the Urban Fire Forum’s advocacy is a clear distinction between manufacturer-driven stock or program apparatus and a National Fire Apparatus Specification defined by the fire service. While manufacturer stock programs are typically proprietary, dealer-controlled, and vary by company, the NFAS would establish non-proprietary, category-based baseline specifications developed by the fire service and built by manufacturers, which would be openly available and competitively procured.

Under this hybrid model, standardized base apparatus would be supplemented by clearly defined, interoperable “menu options” and tiered specifications (trim levels) aligned with distinct

operational environments, including metropolitan, urban, suburban, rural, and wildland urban interface (WUI) responses. This structure reduces excessive customization, streamlines manufacturing and procurement, and enhances interoperability across jurisdictions, particularly during large-scale disasters and mutual aid operations.

By advancing these concepts at the national level, the Urban Fire Forum is positioning the NFAS as a scalable, publicly accessible alternative to the fragmented, highly customized procurement practices that currently dominate the fire service. By establishing a nationally recognized, fire service–led specification, the NFAS also creates a clear pathway for integration into cooperative purchasing programs and eligibility for federal and state grant and incentive funding, enabling departments to leverage shared standards to accelerate procurement, reduce costs, and improve equitable access to critical apparatus resources.

The Urban Fire Forum’s work underscores the importance of education, collaboration, and shared leadership among fire service professionals, manufacturers, and policymakers to ensure that standardization is implemented thoughtfully and effectively, providing a credible pathway for transforming individual departmental best practices into a cohesive national strategy that strengthens operational readiness, fiscal sustainability, and interoperability across the fire and emergency services.

The fire apparatus manufacturing industry has faced a wide range of post COVID challenges, including persistent supply chain disruptions, labor shortages, evolving regulatory requirements, and a surge in demand.

While the industry is working to increase production capacity, it will take time to clear the backlog and return to pre-COVID levels of stability. The trends observed over the past twenty-

five to thirty years suggest that the industry will continue to experience cycles of ups and downs, ultimately balancing out over time.

Developing the Fire Apparatus Committee

Apparatus Specification Committee

Some fire departments unfamiliar with apparatus specification and procurement processes may lack the staffing to manage the intensive research and the planning involved. Personnel turnover within fire departments and among manufacturers further compounds these issues, emphasizing the need for long-term planning and documentation of decision-making rationales.

A vital component of successful procurement is comprehensive, detailed specification of work at the outset. Educating committee members on the financial and temporal impact of post-contract changes helps mitigate risk and keeps projects on track. Apparatus committees must understand that even minor post-award modifications can lead to significant delays and increased costs. Therefore, initial investment in training and knowledge-sharing pays dividends throughout the procurement process.

The recommended membership makeup of a fire apparatus specification committee should include a diverse group of stakeholders who bring a range of perspectives, expertise, and operational experience. Ideally, the committee should consist of representatives from key functional areas such as:

- Frontline firefighters
- Apparatus operators
- Maintenance personnel

- Training Officers
- Command staff
- Risk management (safety)
- Contracting Officer

Inclusion of apparatus management staff and procurement or finance personnel (if available to you) ensures that both operational needs and budgetary constraints are considered. This cross-functional approach fosters well-rounded decision-making and helps ensure that the final apparatus specification effectively supports the department's mission, operational goals, and long-term sustainability.

Defining Apparatus Requirements and Community Need

Adapting to the Industry Environment

To navigate supply chain constraints and budget limitations, fire departments are re-evaluating apparatus needs, operational needs, and procurement strategies. Some are extending the life of existing units, increasing investments in apparatus maintenance, and refurbishing older apparatus. Several agencies are evaluating smaller, rapid response apparatus as a way to meet service needs and extend the lifespan of their larger, more expensive apparatus. Others are shifting toward multi-functional apparatus or altering their engine-to-ladder truck ratios to maximize versatility and cost efficiency.

Refurbishment of fire apparatus has become an increasingly practical and cost-effective solution for departments looking to extend the service life of their apparatus without the full investment of a new apparatus. Whether driven by budget constraints, long lead times for new builds, or a desire to preserve existing equipment with low mileage and solid structural integrity,

refurbishment allows departments to restore and upgrade critical components of an apparatus to improve safety, reliability, and performance. From full chassis replacements and pump rebuilds to targeted mechanical updates and cosmetic enhancements, refurbishment offers a range of options tailored to the condition of the unit and the department's operational needs.

The most successful and well-received refurbishments among fire service personnel are those that include a new chassis and meet the requirements of NFPA 1910. This is where driving experience is most impacted, and where advancements in technology, safety, and performance are most evident. Pairing a new chassis with a full transfer and rebuilding of the pump and body results in a high-quality apparatus with exceptional reliability. These projects deliver a near-new apparatus and offer the best overall return on investment in terms of long-term performance, safety, and service life—typically extending the life of the apparatus by 10 years or more.

When budgets are more constrained or when departments already have apparatus with low mileage and solid structural integrity, a chassis-retained refurbishment can be a strong alternative. This approach involves a thorough overhaul of the cab, chassis drivetrain, and other key mechanical and electrical systems, along with a complete transfer and rebuilding of the pump and body. It provides a significant service life extension, generally in the range of 5 to 8 years, and restores functionality and reliability without the higher investment of a brand-new chassis.

For departments facing the highly constrained budgets or simply seeking to extend the life of an aging unit for a few more years, a selective refurbishment is an option. This includes addressing only critical mechanical and cosmetic issues, replacing worn components, repairing damage, and thoroughly cleaning, adjusting, and realigning systems. These projects emphasize

essential updates and preventative care, typically yielding an additional 2 to 5 years of dependable service.

Refurbishing a fire apparatus can lead to significant downtime, leaving the department without a critical piece of equipment for an extended period. Additionally, older apparatus may present unforeseen mechanical or structural issues during refurbishment, potentially increasing costs and delaying the return to service.

It is imperative to have apparatus evaluated by a fire apparatus refurbishment facility to ensure the apparatus is a viable candidate for a refurbishment.

This adaptive mindset is a direct response to increasing apparatus costs and prolonged delivery schedules. Group purchasing, once rare for custom apparatus, is now gaining traction. Even customized units may benefit from regional or inter-departmental collaboration, which can leverage economies of scale and minimize redundancy.

Fire apparatus manufacturers increasingly offer stock or program apparatus as a way to help fire departments reduce lead times and quickly meet operational needs. Some manufacturers maintain a full line of stock apparatus; ready-built engines, tankers, or aerials, available for immediate delivery or with minimal customization. Others may only produce a limited number of stock units each year within their standard lineup of custom-built apparatus. These stock units typically follow a standardized specification, allowing them to be built more efficiently and quickly compared to custom designs.

For departments in urgent need of replacement or additional apparatus, stock units offer a practical solution, balancing speed of delivery and functionality along with possible reduced costs.



Forsyth County (GA) Fire Department recently placed in service a 2025 stock pumper with a 750-gallon tank, 1,500 GPM pump.

Purchasing a stock or program apparatus is proving to be advantageous for many departments that are working to control costs and shorten delivery times. Deciding between stock and custom fire engine designs requires balancing factors such as cost, delivery timelines, and the need for customization. Stock units offer faster availability and lower initial costs, while custom apparatus provide tailored features to meet unique departmental operational needs, though often at a higher price and with possibly extended lead times.

Stock Fire Apparatus

Advantages:

- Quick availability: Stock units with limited options are pre-built and ready for faster delivery, ideal for departments that need rapid apparatus replacement.
- Cost-effective: These apparatus are generally more affordable, making them a smart choice for budget-conscious departments.
- Simplified decision-making: With pre-configured options available, departments can make faster decisions and may still have limited customization opportunities.

Disadvantages:

- Limited customization: Stock units may not align perfectly with specific operational procedures or preferences.
- Operational compromises: Departments might need to adapt to the features and limitations of the stock configuration.
- The stock units may not be sufficiently standardized with the existing apparatus.



Custom Waco Fire Department (TX) Quint 105-foot aerial, 400-gallon tank, 1,500 GPM pump

Custom Fire Apparatus

Advantages:

- **Tailored fit:** Custom units are designed to meet exact operational needs, from crew capacity and equipment storage to specialized tools and functionality.
- **Optimized performance:** Custom features can improve firefighter safety, efficiency, and usability.
- **Standardized with existing apparatus.**

Disadvantages:

- **Higher upfront costs:** Customization typically increases the initial investment.
- **Extended lead times:** Designing and building a custom unit can take significantly longer than a stock or program apparatus.
- **More planning required:** Custom builds involve detailed coordination with manufacturers to ensure specifications are properly met.

Key Factors to Consider

- **Budget:** Departments with financial constraints may lean toward stock units, while those with more flexibility can explore custom apparatus.
- **Urgency:** If a department needs a new apparatus quickly, stock apparatus can offer a quicker solution.
- **Operational Demands:** Unique or specialized missions may warrant the precision of a custom build.

- **Customization Needs:** Departments seeking specific features should weigh whether stock models can be adapted or if custom apparatus are the better route.
- **Mixed Approach:** Departments may also adopt a hybrid strategy—using stock units where faster delivery and cost savings are priorities, while planning for long-lead custom units as part of their longer-term needs.

Clear and timely communication between the fire department, local dealer, and manufacturer is essential to navigating the availability of stock or program apparatus. Knowing what's currently available, or what will be in production soon, can help departments plan strategically and act quickly when an opportunity arises. Manufacturer demonstration units, often built to showcase features and capabilities, are another purchasing option. However, demo units are typically few in number and tend to sell quickly due to their discounted pricing and reduced delivery time. Departments interested in this route must be proactive and ready to move fast when such apparatus become available.

Standard Offerings vs. Complex Customization

Opportunities for Standardization

Many apparatus manufacturers offer stock or program apparatus. While a universal stock specification for engines, ladders, or rescue apparatus may be unrealistic given regional variability, a hybrid approach may offer a viable compromise. In this model, manufacturers would produce stock apparatus with customizable “menu options”, commonly requested modifications, that could be integrated without affecting build timelines.

Initiating this approach with manufacturers, who already maintain stock programs, could help standardize the industry's most popular configurations and reduce procurement times without compromising critical operational features.

Developing standard specifications for fire apparatus across five distinct categories, metropolitan, urban, suburban, rural, and wildland urban interface (WUI), is essential to ensure apparatus are purpose-built for the operational demands of their environment while supporting consistency in apparatus management, training, and maintenance. Urban engines often prioritize high-flow pumps, maneuverability, and advanced electronics for dense city responses, while suburban engines balance maneuverability with water supply and storage needs for mixed residential and commercial areas. Rural apparatus typically requires larger water tanks, simplified systems for ease of maintenance, and all-terrain capabilities to navigate unpaved roads and extended response distances. WUI engines demand specialized features such as pump-and-roll capability, increased ground clearance, and rugged design to operate effectively in transitional zones between developed areas and wildlands. By establishing clear, category-specific standards, departments can optimize performance, improve interoperability, and reduce long-term lifecycle costs.

Standard fire apparatus specifications developed by national organizations like the IAFC, state-level fire service leadership such as a State Fire Marshal's Office, or regional collaborations among local jurisdictions represent significant improvements over the current highly customized, fragmented approach that dominates the U.S. fire service. These standardized specifications can promote greater consistency, streamline procurement processes, reduce costs through economies of scale, and simplify training, maintenance, and mutual aid operations. By shifting away from

fully custom builds toward shared, well-defined standards, fire departments can maintain high operational effectiveness while improving apparatus interoperability and long-term sustainability.

The challenges facing fire apparatus procurement today are multifaceted, shaped by both internal and external pressures. Departments must be proactive, resourceful, and collaborative in responding to these conditions. Maintaining continuity in apparatus committees and carefully planning specifications can help departments avoid costly delays. Moreover, flexible and innovative strategies , such as group purchasing and embracing multi-purpose apparatus , will be key in navigating the current landscape. Finally, education remains the cornerstone of all successful procurement efforts, ensuring that personnel at every level understand the complexities, constraints, and opportunities involved in apparatus acquisition.

Costing and Budgeting Planning

Overview

A call for action was established to bring municipal/governmental, administrative, operations, financial, and manufacturing stakeholders together to discuss the current state of emergency apparatus purchasing and manufacturing. The intent is to engage industry experts (in specification, finance, and manufacturing) to gain a mutual understanding of market variables and to positively affect manufacturing lead times and apparatus costs.

Costing and Budgeting

Budgeting requires that local, state, and national/provincial governments have a system in place to assess capital assets. The Government Finance Officers Association (GFOA) identify

that regular capital assessments are needed for adequate budget planning and operational risk reduction. Emergency service apparatus that meet the classification of a capital expense require special attention as the market has seen increases in cost and lead/manufacturing timeframes.

To best plan for these major expenses, municipal administrators, elected officials, finance directors, and fire chiefs must have a better understanding of items that influence the market (cost and lead-time). Understanding the realistic expectation of apparatus purchases may impact the methods in which contracts are drafted, ordinances are written, audits are conducted, and purchases are funded/communicated (transparency). There is an appetite in government finance to demystify the purchasing process to better understand the industry perspective and identify variables that should be re-evaluated when specifying, budgeting, funding, reporting, and planning obsolescence of emergency apparatus.

Municipal administrators and finance directors appreciate that emergency apparatus specification must be driven by those who serve in the fire and emergency medical services; however, the variables associated with each purchase needs clarification. Those who are responsible for municipal/governmental budgets would like to better understand when customization is required and when a standardized specification is sufficient. Further, it is essential that ethical spending practices are followed. Ultimately, the underlying question is: “Is it possible for municipal/governmental stakeholders to positively influence the apparatus specification, funding (pricing), and manufacturing process?”

Municipal budgets are not infinite; spending restraints imposed through policy and administrative rule create pressures that impede capital planning and purchasing. Considering the overall outlay of municipal/governmental budgets, expenses must be funded based on priority and risk reduction. Without a multi-year plan and/or project funding, capital assets may be difficult to sustain in a condition that can assure predictable service levels. Deferring

replacement and relying on repairs and maintenance could increase long-term cost and liability.

In the case of emergency services, the inability to sustain a fleet of apparatus could threaten public health, safety, and the community's expected quality of life.



District of Columbia Fire and EMS Department fleet maintenance shop welding room.

Life Expectancies of Fire Apparatus

Life Expectancies of Fire Apparatus

To best plan for apparatus management, finance professionals recommend being proactive and promoting adequate investments in maintenance, renewal, and replacement strategies. NFPA 1910 (Guidelines for First Line and Reserve Fire Apparatus) recommends that

first-line fire apparatus are no more than 15 years old. The standard further outlines that fire apparatus over 25 years old should be replaced.

The need for replacement can be projected out and adjusted as variables impact on equipment longevity (mileage, engine hours, accidents, etc.). The GFOA identifies that policies guiding capital asset management should be supported by finance, administration, and operational/engineering experts. Replacement will ultimately depend on the true condition of the existing apparatus, down time, maintenance costs, parts availability, reliability/safety, and mission relevance (could the fire department operate without the apparatus).

Extending the Life of Fire Apparatus

Extending the life of fire apparatus is a multifaceted effort that requires strategic planning, adherence to standards and a commitment to operational excellence. The NFPA 1900 standard emphasizes the importance of aligning apparatus design with mission-specific needs, ensuring that vehicles and apparatus are not only compliant but also optimized for their intended response settings. By designing apparatus tailored to specific response types, whether structural, wildland, or EMS, departments can reduce wear and tear, reduce mechanical out of service time and extend service life.

A robust driver/operator training program is essential to apparatus longevity. The NFPA standard stresses that apparatus must be operated within their design parameters; this begins with qualified personnel behind the wheel. A quality driver/operator training program reduces the risk of mechanical stress, accidents, and premature component failure.

Mechanical stress, accidents, and premature component failure place significant strain on apparatus performance and longevity. Data-informed fire department safety programs are essential, incorporating targeted collision and apparatus damage prevention measures. Even a

single preventable collision can take an apparatus out of service for an extended period, shorten its operational lifespan, or result in a total loss.

Equally important is the role of certified Emergency Vehicle Technicians (EVTs), who ensure that inspections, diagnostics and repairs are performed to the highest standards. NFPA Standard 1910 indicates that any person performing diagnostic checks, inspections, maintenance or testing on a fire apparatus must meet the qualifications of NFPA 1900.



District of Columbia Fire and EMS Department Emergency Vehicle Technicians performing repair and maintenance on a department tower truck.

General breakdown of EVT certification levels,

- EVT-1 – Inspections and operational checks
- EVT-2 – Testing and repairs
- EVT-3 – Lead or supervisory level, quality control

The Emergency Vehicle Technician Certification Commission offers EVT Certification Tracks in the following areas,

- Fire Apparatus Technician
- Ambulance Technician
- Aircraft Rescue Firefighting (ARFF) Technician
- EVT Management

Preventative maintenance is a cornerstone of apparatus longevity. NFPA 1900 and 1910 recommend that departments implement a structured maintenance program that includes regular inspections, diagnostics, and timely repairs. This includes monitoring critical systems such as brakes, suspension, electrical, aerial ladder, and pump components. Delaying repairs can lead to cascading failures and increased downtime, ultimately shortening the apparatus' useful life and can increase safety risk.

An additional operational consideration to influence the ability to extend the life of apparatus includes rotating apparatus from busy companies to slower companies or stations to reduce wear as the apparatus ages. Finally, using the right apparatus for the right incident may be a practical but overlooked strategy. Over-deploying heavy apparatus for minor incidents not only increases fuel and maintenance costs but also accelerates wear. When appropriate departments should consider deploying smaller, more agile apparatus for medical and non-fire related service calls, preserving larger apparatus for fire and rescue incident response.

In summary, extending the life of fire apparatus has several layers,

- Design apparatus for the environment that it will operate in.
- Utilize a robust driver/operator training program.

- Ensure apparatus is tested, maintained, and repaired by certified EVTs.
- Build a comprehensive preventative maintenance and repair program.
- Rotate apparatus to slower assignments as they age.
- When possible, utilize the right apparatus for the incident type.

Reference details:

1. <https://www.evtcc.org/certifications>
2. <https://fdsoa.org/training/evt/>

Changes over the past few years

Recent purchasing and manufacturing activities have influenced other elements of apparatus replacement planning. Although the process of specification, bidding, purchasing approval, and signing contracts has remained consistent with past practice, once a contract is signed, the job/project is put into a queue at the manufacturing facility. It is not uncommon to wait three years (or more) for delivery of a new apparatus from the time that the contract is signed. This delay in manufacturing has impacted typical financial practices and funding methods. Many communities are re-evaluating incentives for apparatus pre-payment. Borrowing and/or paying for an apparatus that isn't delivered in the same fiscal year or following fiscal year can be problematic from a procurement standpoint. Contracts are needed to protect purchasers from the risk associated with not receiving an apparatus that has been purchased up-front. Some municipal purchasing ordinances/rules have been challenged because the governmental body that approves the purchase may not be the same governmental body that receives the asset (due to elections).

Where are we headed?

Finance leaders understand that “typical” government finance practices need to be evaluated. If the post-pandemic state of apparatus supply/demand is the “new normal” for apparatus, adjustments will need to be made to current purchasing practices. However, adjustments need to resemble predictable/duplicatable financial purchasing and auditing practices that support governmental policy, ethics, and transparency.

It is extremely difficult to identify the cost of parts and raw materials over a multiple-year time frame – contingency planning that identifies cost estimates -vs- actual expense (and offers reimbursement of unused funds) may be needed so that approvals are transparent and understood by the governmental bodies that approve project/asset funding.

Best Practices

Communication is essential to planning asset replacement. Forecasting obsolescence is an important component of risk management and budget prioritization. Government finance requires capital planning, budgeting, and assessments/reporting – to encourage appropriate capital saving/spending levels. Multi-year capital plans will ensure that necessary investments are made to maintain capital assets that support municipal services.

One method to communicate the urgency of replacement (and the timing of scheduled purchases) is through the use of an asset inventory and/or condition and serviceability assessment (Appendix A). The intent behind this assessment is to provide essential asset information to fleet managers and finance directors. It trends important information that may impact the projection of replacement. These perpetual inventory systems allow fleet managers to continually communicate the status of capital assets and allow for conversations to take place in advance of an urgent/critical replacement request.

A report on capital assets should be shared after the assessment is conducted. The condition rating for each apparatus asset should be shared and identify if the rated apparatus is on target for its scheduled replacement. Year-to-year changes should be highlighted as well as significant mechanical issues and/or damage reports. Indirect influences may also need to be communicated, especially if apparatus modification is required due to operational mandates and/or safety concerns. This assessment will also identify if budgeted expenditure performance data meets the demand of long-term market trends and can support the projected purchase. Purposeful forethought will afford decision makers with the most amount of time to make other “global” budget adjustments to accommodate purchases that need to be expedited (ahead of scheduled replacement).

Fire Apparatus Replacement Planning

It is important to note that fire apparatus replacement is only one aspect of the municipal budget. All major assets need to be considered when trying to even-out purchases from year-to-year. By forecasting major asset replacement and by scheduling purchases, finance/budget directors are offered an opportunity to adjust annual budget distributions and practice expenditure restraint (to reduce sticker-shock for those who approve the budget... and those that pay for it). It helps if educated decisions can be made about modified budget requests and capital adjustments – so that urgent funding priorities are not overlooked.

Sustainability

Longer lead-times in the purchasing and manufacturing process may require capital budgets to be projected further. Longer manufacturing queues may also require fire departments to consider a replacement schedule that accounts for the anticipated delay. Apparatus

replacement can be projected out 10 – 20 years, and modifications to capital purchases can be adjusted based on the dependability of the asset at the end of their lifespan.

Every participant in this process needs to own their portion of the problem. The emergency apparatus market has shifted, demand has spiked, raw materials are more expensive, costs have increased, and delivery time has impacted operational readiness. If the fire service wants its apparatus management to be sustainable, we need to be able to control cost and maximize asset availability.

What this used to look like

In the not-too-distant past, the fire service would work to develop an apparatus specification. The specification would typically resemble existing apparatus and follow a similar price point. Typical, annual inflationary cost increases could be calculated to predictably budget for asset replacement.

Fire Chiefs would work with their finance department or department treasurer and budgeting authority to address budget projections (CIP- Capital Improvement Budgets), specification, bidding, governmental approval, contracting/ordering, manufacturing, purchasing, and training. CIP Budgets would be projected for multiple years so that municipal budgets could be adjusted, and larger purchases could be prioritized.

Many apparatus were manufactured using a custom specification unique to the department that ordered the apparatus.

What it is today

Many of the same manufacturing practices (that existed before the market shift) exist today. Compartment configuration, water tank size and placement, suspension, piping, pump type, electrical systems, emergency lighting, and paint color/scheme are all examples of variables that contribute to a custom package. Given all the variables that occur in apparatus

specification, the manufacturing process requires a modified assembly line that addresses the needs of a custom design, these same design components may or may not be duplicated by the next apparatus on the line. This also increases the engineering time and costs for every individual custom apparatus to be designed.

More recently, tariffs were introduced that may affect the price of raw materials (like steel, copper, and aluminum). This creates uncertainty and is something that we have to keep in the forefront as we identify costs, cost increases, and supplies. Some of this is indirect, however it can impact costs, availability, and deliveries.

Where do we go from here?

From a financial perspective, finance officers may have to revisit financing practices that meet government auditing standards- and reflect the current state of asset management. In one example, the GFOA recommends that governments adopt written policies that address capital asset reserves for renewal and replacement. Well-designed capital reserve policies support proactive financial management – while addressing the demands that exist with the government’s resources.

The EVMS Working group will continue to track the progress of finance officers in addressing the expenditure management practices to share with the broader fire service, especially for those departments that do not have access to finance professionals.

Governments and departments with Boards of Directors that accept a multi-year planning and budgeting process can accumulate funding for anticipated capital needs. Per the GFOA, careful funding decisions should be made for categories such as apparatus, technology, and smaller facility needs. Reserves can be used to proactively manage capital assets (for instance, by setting aside 20% of a five-year replacement cost). Reserves can also be used to address unforeseen or catastrophic capital needs.

Ultimately, a capital reserve for renewal and replacement policy can address:

- Communicating a shared vision/shared understanding of priority
- Objectivity in decision making
- Fiscal justification when making and explaining difficult decisions
- Credit strength – policies are viewed positively by bond rating agencies
- Public awareness through project communication/funding

Apparatus replacement projections are influenced by anticipated asset reliability and longevity. To promote long-term planning and the development of a replacement schedule, Appendix B and Appendix C were developed to assist with determining the projected lifespan of apparatus assets and considerations needed for replacement planning.

Desired Outcomes

The intent is to leverage this document as a training and educational tool to help with overall planning, purchasing, and sustainability for emergency apparatus purchasing. With this research, the following outcomes are desired:

1. Identify the root causes of procurement delays and rising costs.
 - a. Pre-COVID
 - b. Post-COVID
 - c. Regulatory Changes
 - d. Market Dynamics
2. Analyze historical and emerging trends affecting apparatus availability.
 - a. Production Capacity
 - b. Order Surge
 - c. Backlog

3. Deliver clear, evidence-based market observations and provide recommendations to mitigate adverse impacts.
 - a. Concern about limited competition and consolidation of economic power.
 - b. Concern about anti-trust and barriers to smaller manufacturers.
 - c. Transparency with manufacturer-production investments and the impact backlogs have on profit.
4. Equip agencies with tools for apparatus planning.
 - a. Resilient – to weather market fluctuations.
 - b. Strategic – consider stock/standardized or custom purchasing options as well as possible changes to some operational aspects.
 - c. Sustainable – to understand best practices of government finance, planning, budgeting, and operational planning so that apparatus purchases can be funded reliably.
5. Provide policy guidance to support informed decisions at local, regional, and national levels.
 - a. Purchasing adjustments from fire service agencies.
 - b. Address spending policy that better informs municipal finance directors, administrators, and elected officials.
 - c. Manufacturing adjustments from emergency apparatus manufacturers.

With this information, the Emergency Vehicle Supply and Demand Workgroup can better develop a training program that will leverage round table discussions and establish published guidelines/curriculum- using research that can better predict market fluctuations and plan for market challenges. These recommendations can also help to guide the optimization of manufacturing and assembly processes. The results of this research can be shared at national,

regional, and local conferences/symposiums and/or virtually through broadcasting/streaming outlets.

Conclusion and Call to Action

The landscape of emergency apparatus purchasing has been influenced by a global pandemic, supply chain shortages, market instability, production/purchasing trends, and available labor. Adjustments to manufacturing were needed to address order backlogs and longer production lead times. Requisite facilities and assembly infrastructure took time to tool and staff; further, the traditional design of mostly custom apparatus were impacted by the availability of a skilled workforce - similarly affected by limited duplication in apparatus (from one municipality to another). It is also important to note that over-staffing the workforce and over-fortifying manufacturing infrastructure creates future employment and investment concerns as the demand spike subsides as predicted through market trend analysis.

Research has indicated that fire departments may need to re-evaluate apparatus needs and procurement strategies. The longevity of equipment is part of the overall concern that fleet managers must consider what should be repaired, what can be refurbished, and what needs to be replaced. Advantages and disadvantages were referenced as part of this research based on budget, urgency, and necessary customization. Apparatus management is ultimately affected by serviceability and downtime.

The fire service can more predictably address its apparatus management when it actively involves finance directors, treasurers, and communicates purchasing plans well in advance of the need. Part of this process is to address the life expectancy of emergency apparatus so that investments can be funded and approved. Fire service leaders must work directly with manufacturers so that market fluctuations can be managed, and significant spikes in demand can

be better controlled. Although fire apparatus manufacturers are in a competitive industry, smaller manufacturers may be able to absorb spikes in demand if availability is better understood. Further, better standardization of product specifications alleviates compatibility concerns.

From a service perspective, apparatus longevity is positively impacted from standardization. If original equipment manufacturer (OEM) parts are shared, service technicians can stock items that are regularly used – reducing downtime. Parts availability influences apparatus longevity. The longer parts are available (based on the demand of a standard specification); the longer apparatus can remain in-service. When OEM parts are no longer available, the lifespan of an asset is significantly reduced (even as a back-up/reserve unit).

In summary, the availability of mechanically-sound fire equipment was significantly impacted over the past five years. Congruently, purchase prices rose exponentially at rates that were difficult to navigate. This workgroup identified that the design, specification, funding, manufacturing, procurement, and operation of emergency apparatus must be realistic and sustainable.

Consumer trust is essential to ensure that necessary equipment is sold with the best interest of public safety in mind and that traditional purchasing approaches do not jeopardize readiness. The Work Group understands that emergency apparatus manufacturing is a business, and that businesses succeed when they are profitable.

Although additional work is needed, the findings outlined in this paper offer a strong foundation for continued discussion and underscores the importance of ongoing dialogue with those responsible for both the causes and the impacts.

Appendix Information

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Appendix B – Asset Inventory, Projected Lifespan,

ASSET INVENTORY:

- This was a start to facilitate the decision-making process (based on NFPA 1910).
- We need to consider adding any additional points that fire departments are using to determine vehicle condition. (Telematic software and Fleet Management software for vehicle management.)

PROJECTED LIFESPAN – FIRE APPARATUS:

- The Duty Cycle on the bottom is a stab in the dark (based on a 15- and 25-year estimate)

PROJECTED LIFESPAN – AMBULANCE:

- The comment about replacement at the 250,000-mile mark was based on something that I found from an ambulance vendor.
- The ambulance Duty Cycle is an estimate that needs additional evaluation.
- Not a lot of supporting information about ambulances – other than what I found in NFPA 1917.

ASSET INVENTORY - CONDITION AND SERVICEABILITY ASSESSMENT

Inventory/Assessment Date: _____ Recommended Reassessment: 1 2 3 years

Fleet Number: _____	Unit Number (if different): _____
Year: _____	Make: _____ Model: _____
Asset Type: ENGINE AERIAL RESCUE UTILITY AMB SPEC. OTHER	
In Service Date: _____	Original Value: _____
Asset Location/Station: _____ (list all assignments/dates) _____ _____ _____ _____	
“As Built” Documents (Location/File Path): _____	
Warranty Information (Location/File Path): _____	

Mileage: _____ Engine Hrs: _____ Idle Hrs: _____

Significant Maintenance/Repair (since last assessment)	Date	Cost
Use additional spreadsheet (if needed)		

Last DOT / NFPA Inspection:	Date	Condition/Concerns
Pump		
Aerial Device (if applicable)		
Tires (Abnormal Wear?)		
Brakes		
Other		
Attach Inspection Reports – or identify report location		

Accident/Collision History (since last assessment)	Date

Attach additional spreadsheet (if needed)

Vehicle Condition (circle number)									
REPLACE		PLAN REPLACEMENT		GOOD / SERVICEABLE		VERY GOOD		EXCELLENT	
1	2	3	4	5	6	7	8	9	10

PROJECTED LIFESPAN / FIRE APPARATUS REPLACEMENT PLANNING

NFPA 1910 F.1 General:

It is recommended that apparatus more than 15 years old (that have been properly maintained and that are still in serviceable condition) be placed in reserve status.

Apparatus that are not manufactured to the applicable NFPA standards (or that are over 25 years old) should be replaced.

NFPA 1910 F.2 Evaluating Fire Apparatus:

The length of [lifespan] depends on many factors:

- Vehicle mileage
- Engine hours
- Quality of preventative maintenance program
- Quality of driver training program
- Conditions of use (vehicle used as designed)
- Apparatus manufacturer (custom or commercial chassis)
- Quality of Components

NFPA 1910 F.5 Refurbishing or Replacing Fire Apparatus:

Decision factors for vehicle replacement – poor performance in any of these areas requires additional consideration for expediting replacement:

- True Condition (poor maintenance and/or collision history)
- Anticipated Maintenance/Repairs
- Mission critical (does the vehicle still serve its intended purpose... is the intended purpose still a concern for the community/emergency response?)
- Quality of preventative maintenance program
- Downtime/Reliability of asset
- Mandated Safety Requirements
- Parts Availability – if parts are discontinued, replace.

Fire Apparatus Manufacturers Association – Apparatus Duty Cycle (95th percentile):

ASSET	ANNUAL		RESERVE (15)		REPLACE (25)	
PUMPER	MILES	HOURS	MILES	HOURS	MILES	HOURS
• Urban	18,750	1,660	281,250	24,900	468,750	41,500
• Suburban	16,000	1,520	240,000	22,800	400,000	38,000
• Rural	7,750	1,750	116,250	26,250	193,750	43,750
AERIAL						
• Urban	13,750	1,341	206,250	20,115	343,750	33,525
• Suburban	11,250	1,266	168,750	18,990	281,250	31,650
• Rural	8,750	900	131,250	13,500	218,750	22,500

Theoretically, Apparatus will not add as much mileage in reserve status.

PROJECTED LIFESPAN / AMBULANCE REPLACEMENT PLANNING

General:

Looking at historical data/trends, the longevity of an ambulance is dependent on use, maintenance, safety upgrades, and the quality of manufacturing processes.

The newest ambulances in the fleet serve as front-line response vehicles and the older/higher-mileage ambulance are placed in reserve status. Many agencies are replacing vehicles (in reserve status) before they reach the 250,000-mile mark.

NFPA 1917 Annex B.2 Evaluation of Ambulances:

The length of [lifespan] depends on many factors:

- Original manufacturing materials and processes
- Service and maintenance history
- Quality of workmanship
- Operational Environment (climate, corrosion, urban-rural)
- Low versus high call volume use
- Presence or absence of safety features
- Relevance or obsolescence of technology

Cost-benefit analysis of remounting versus replacing:

Criteria to consider includes the following:

- What is the value of the current unit at wholesale trade?
- What is the cost of a new purchase less trade in value?
- What is the cost of remounting the patient compartment on a new chassis?
- What is the cost of a new versus the cost of remounting?
- Is the cost savings sufficient to warrant forgoing the features of a new ambulance built to current standards?
- What is the cost of loss of use during the remount process?
- What is the delivery time of new versus remount time completion?
- What are the potential cost savings that can result from modern ergonomics and efficiency with a patient compartment built to current standards?

Ambulance Duty Cycle:

ASSET	ANNUAL		RESERVE (5)		REPLACE (10)	
AMBULANCE	MILES	HOURS	MILES	HOURS	MILES	HOURS
• Urban	26,000	1,450	130,000	7,250	260,000	14,500
• Suburban	28,000	1,540	140,000	7,700	280,000	15,400
• Rural	30,000	1,650	150,000	8,250	300,000	16,500

Theoretically, Apparatus will not add as much mileage in reserve status.

Appendix C - Emergency Vehicle Supply Survey

Emergency Vehicle Supply Survey

The **Emergency Vehicle Management Section (EVMS)** formed a collaborative work group with the **Metropolitan Fire Chiefs Association**, **Wisconsin State Fire Chiefs Association**, and the **Fire Apparatus Manufacturers Association** to examine the range of challenges fire departments are facing with emergency vehicle procurement so we can get to the root causes of increased costs and extended delivery times.

The work group will create a **white paper** that presents strategies that fire departments can consider to best manage their unique challenges created with the current supply and demand situation as well as offer policy recommendations. As part of the **white paper** development, the work group seeks your input by asking you to complete this survey.

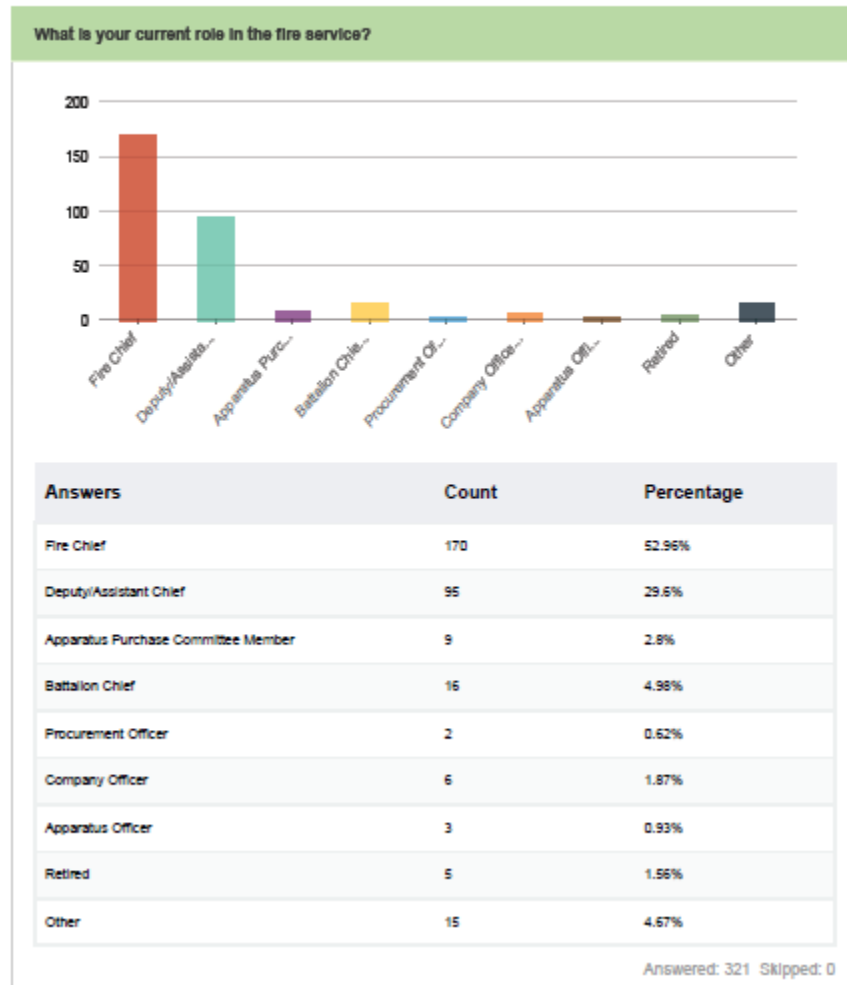
What is your current role in the fire service?

- Fire Chief
- Deputy/Assistant Chief
- Apparatus Purchase Committee Member
- Battalion Chief
- Procurement Officer
- Company Officer
- Apparatus Officer
- Retired
- Other

What type of fire department do you serve in?

- Municipal Fire Department
- Volunteer Fire Department
- Combination Department
- Industrial/Private Fire Brigade
- Other

Emergency Vehicle Supply Survey



Second Fire Service Apparatus Survey

U.S. Fire Departments' Experience with Apparatus Maintenance and Replacement

During November and December 2025, the Work Group distributed a nationwide on-line survey to members of the IAFC and the Metropolitan Fire Chiefs Association (Metro), seeking answers to questions about fire departments' experience with apparatus maintenance and replacement. The general questions that were asked included:

▪ **Department Overview**

- Department Name
- State
- Type Department (career, combination or volunteer)
- Annual number of Incidents
- Square Miles Protected
- Total Engines
- Total Trucks (Ladder Companies)
- Total Rescues (Heavy Rescues)
- Total Ambulances

▪ **Maintenance**

- Primary Maintenance Organization (Municipal or Private)
- Type of Municipal Facility if Applicable (Centralized vs. FD Managed)
- Outsourcing Maintenance (Yes or No)
- Type of Private Facility if Applicable (Specializes in Emergency Vehicles Yes or No)
- Service Technician Certifications (EVT, Blend or Not Certified)
- Satisfaction with Quality and Timeliness of Services (Yes or No)
- Underlying Reasons That FD is Not Satisfied with Quality and Timeliness of Maintenance Services (Open Ended Response)

▪ **Apparatus Replacement**

- Does the FD Have a Service Goal for Apparatus Replacement (Yes or No)
- Explanation of Service Goal by Apparatus Type (Engine, Truck, Heavy Rescue and Ambulance)
- Is the FD meeting the Apparatus Service Goal (Yes or No)
- Does the FD Apparatus Replacement Plan Have Sufficient Funds (Yes or No)
- Is the FD Satisfied with the Construction and Delivery Time by Primary Manufacturer of New Apparatus (Yes or No)
- Is the FD Supportive of a More Standardized Design of Apparatus (Yes or No)

▪ **Contact Information for Follow-up**

A total of 293 responses were received representing 157 career departments (53%), 93 combination departments (32%), and 43 volunteer departments (15%). The population collectively protected by these departments totaled 63,258,929, ranging from as few as 500 residents served by a volunteer fire department in Colorado to 9.7 million residents served by the career L.A. County Fire Department. Among the departments participating in the survey, there were as few as 5 incidents to as many as 2 million incidents annually. Altogether the departments maintained 5,138 engines, 1,641 trucks, 1,071 heavy rescues, and 2,738 ambulances representing a total fleet of 10,588 emergency apparatus.

The survey responses were organized by the Chesterfield County (VA) Fire & EMS, Information Systems and Planning Division, using the Microsoft Power BI platform. Seven different dashboards were created including: department overview, maintenance, apparatus, procurement, contact information, survey responses, and response statistics.

Each dashboard can be filtered by state and/or department type (career, combination or volunteer) and can be filtered further by department size according to number of incidents annually as follows:

- **Small:** Fewer than 1,000 incidents.
- **Medium:** 1,000 – 9,999 incidents.
- **Large:** 10,000 – 99,999 incidents.
- **Very Large:** 100,000 or more incidents.

IAFC and Metro members are encouraged to access the link below, which will route to the Power BI dashboard that is stored and maintained on Chesterfield County's cloud. Members may then select the filters that best align with the characteristics of their individual department to view the statistics and other comparative data and information in each individual dashboard.

[Apparatus Maintenance and Replacement Survey Results](#)

If you have any questions or encounter any difficulties accessing the Power BI dashboard, please reach out to Captain K. C. Sehlhorst at: SehlhorstK@chesterfield.gov.

Appendix D - IAFC Testimony for Senate HSGAC hearing re Fire Apparatus 10 SEP 25



Sounding the Alarm:

America's Fire Apparatus Crisis

Statement of

Jason Shivers

Division Chief, Technical Services

Forsyth County Fire Department

presented to the

**SUBCOMMITTEE ON DISASTER MANAGEMENT, DISTRICT OF COLUMBIA, AND
CENSUS**

of the

COMMITTEE ON HOMELAND SECURITY & GOVERNMENTAL AFFAIRS

United States Senate

September 10, 2025

INTERNATIONAL ASSOCIATION OF FIRE CHIEFS

8251 GREENSBORO DRIVE, SUITE 650 • MCLEAN, VA 22102 2

Good afternoon, Chairman Hawley, Ranking Member Kim, and members of the subcommittee. I am Jason Shivers, Division Chief of Technical Services of the Forsyth County Fire Department, and chair of the Emergency Vehicle Management Section of the International Association of Fire Chiefs. I appreciate the opportunity today to discuss issues relating to the cost and delivery times of fire apparatus.

Today I am testifying on behalf of the International Association of Fire Chiefs (IAFC). The IAFC represents the leadership of over 1.1 million firefighters and emergency responders. IAFC members are the world's leading experts in firefighting, emergency medical services, terrorism response, hazardous materials (hazmat) incidents, wildland fire suppression, natural disasters, search and rescue, and public-safety policy. Since 1873, the IAFC has provided a forum for its members to exchange ideas, develop best practices, participate in executive training, and discover diverse products and services available to first responders.

America's fire and emergency service is an all-hazards response force that is locally situated, staffed, trained, and equipped to respond to all types of emergencies. There are approximately 1.1 million men and women in the fire and emergency service – consisting of approximately 300,000 career firefighters and 800,000 volunteer firefighters – serving in more than 30,000 fire departments around the nation. They are trained to respond to all hazards ranging from earthquakes, hurricanes, tornadoes, and floods to acts of terrorism, hazardous materials incidents, technical rescues, fires, and medical emergencies. Your local fire department is usually the first to arrive on scene at an incident and the last to leave.

The Effects of the Problems with the Fire Apparatus Supply Chain

The delays and escalating costs of fire apparatus have been a challenge for local fire departments since the COVID-19 pandemic. Before the pandemic, there was a period of stability in the fire apparatus market, where local fire departments could depend on receiving their newly ordered fire apparatus in a timely fashion and agreed upon price. It usually took 8-12 months for a manufacturer to deliver a new pumper, also termed as a Type 1 fire engine; 12-18 months for an aerial truck; and specialty units would take 18-24 months to deliver. In addition, an ambulance could be delivered in 9-12 months. Cost adjustments after orders were not routine practices.

As a result of the pandemic, fire departments began to see delivery times and costs increase. The delivery time for a Type 1 fire engine almost doubled to 25-28 months. The time period for delivering an ambulance increased from 9-12 months to 14-20 months. This problem steadily escalated. Now, in many cases, fire chiefs can order fire apparatus and expect their delivery in four years. Meanwhile, fire departments reported that the cost of fire apparatus and ambulances increased by 20% to 25%.

This delay in deliveries and increased costs of fire apparatus caused operational problems for fire departments. The shortage of ambulances forced some fire departments to use command vehicles or alternative means of transportation to send patients to hospitals. Fire departments were forced to use apparatus past the 15-year recommended age limit as recommended by the *NFPA 1900: Standard for Automotive Fire Apparatus*. They also were forced to rely upon their reserve fleets, which were older engines that did not have up-to-date safety improvements, were near the end of their operational lives, and suffered from reliability problems with more repairs and shortages of spare parts.

These fire apparatus problems affected community safety. Some fire departments did not have fire apparatus to use for consistent and reliable response to mutual aid response requests from their local neighbors or from across the nation. Without fire apparatus, fire departments could not open new fire stations. The escalating costs of fire engines and other vehicles cut into personnel budgets, reducing the ability to hire new fire and EMS personnel.

The Causes of These Problems

The IAFC created a work group headed by its Emergency Vehicle Management Section, including the Metropolitan Fire Chiefs Association, the Wisconsin State Fire Chiefs Association, and the Fire Apparatus Manufacturers' Association to examine the causes of the increased costs and delivery times for fire and EMS vehicles. After more than a year's examination of the issues causing the problems with the fire apparatus supply chain, the working group found that the fire apparatus industry was hit by a perfect storm of increased orders and historic challenges to the production of fire apparatus.

The COVID-19 pandemic began this problem. In 2020, booked orders for fire apparatus dropped by 12 percent. Illness and pandemic closures led to the closure of manufacturing lines. In some cases, the workforce retired or were laid off. As the pandemic ended, it was hard for the fire apparatus manufacturers to re-hire these workers. So, the companies had to hire and train new staff. This educational period takes time, because the fire apparatus manufacturers are artisans and craftsmen working on custom, hand-built fire machinery.

The overall supply chain crisis caused other problems. Manufacturers faced challenges in purchasing chassis, microchips, wiring harnesses, and other components of fire apparatus. Because the fire apparatus market is so small, the manufacturers of major components like chassis reportedly would sell them to the more profitable commercial sector for the production of over-the-road trucks. These shortages extended into 2022, which resulted in significant delays in production. In some cases, fire departments had to acquire chassis separately and deliver them to the fire apparatus assembly line for production.

As an unintended consequence, the federal government also played a role in creating this problem. In 2022, engine manufacturers announced plans to update their engines to meet the Environmental Protection Agency's (EPA) 2027 emissions standards. Because of previous problems with new engine emissions technology, many fire departments rushed orders to the fire

apparatus manufacturers to buy vehicles that met the existing emissions standards at that time. In addition, the CARES Act (P.L. 116-136) and American Rescue Plan Act (P.L. 117-2) included billions of dollars to help state and local governments respond to and recover from the COVID-19 pandemic. Some of these funds were -- and continue to be -- spent by local fire departments to make large purchases of fire and EMS vehicles.

As fire departments anticipated facing delays in the delivery of fire apparatus, they adjusted their orders. In order to account for the delay, fire departments would order more fire apparatus earlier, so that they could continue to meet their replacement plans. The federal COVID-19 relief funds also provided funding for fire departments to upgrade their fleets.

As demand increased, supply was still limited. In 2022, orders for fire apparatus were 45% more than the 2011-2019 average, which resulted in 70% more orders than the industrial capacity. Meanwhile, the number of fire apparatus shipped was 9 percent below the 2011-2019 average. The increased prices and longer delivery times remain as the fire industry reacts to this storm. In addition, we are waiting to see how the cost of the new EPA-mandated engines, tariffs, or workforce changes will affect the fire apparatus industry.

Actions That Fire Departments Can Take

Fire departments can take steps to address the problems caused by the problems with the fire apparatus supply chain. For example, the fire department can purchase a stock fire apparatus made by one of the manufacturers or dealers. This vehicle may not meet all of the fire department's traditional customization, but it may cost less and will have a shorter delivery time. In addition, fire departments should look at buying a comparable apparatus from manufacturers who have shorter delivery times.

Also, fire departments can enhance their apparatus maintenance programs and reduce the wear and tear on their existing fleet. This will extend the life of their vehicles and reduce the time out of service for costly repairs. However, the NFPA standards recommend that only specially trained Emergency Vehicle Technicians (EVT) should perform maintenance and repairs on fire apparatus. There is a growing need for more EVTs.

In addition, fire departments can refurbish existing fire apparatus. There are firms that will update fire apparatus to meet current safety standards, complete body remounts, overhaul the drivetrain and fire pump, and maintain the aerial ladder. Refurbishments can be made in house. They will extend the life of the vehicle and allow the fire department to maintain its fleet as it waits for its new vehicles to be delivered.

Fire departments also can take administrative actions to address the problems with the cost and delivery of fire apparatus. If one does not exist, it is highly recommended that fire chiefs should develop Apparatus Specification Committees to evaluate department fleets and conduct community needs assessments. These committees can develop comprehensive, detailed specifications for new fire apparatus and prevent costly change orders that delay production of

the ordered vehicles. They also can identify lower cost options or eliminate options that do not justify their cost. Also, these committees can evaluate the community's emergency response needs to ensure that it has the right mix of vehicles, including ambulances for EMS response.

Fleet management and department finance personnel should be included on the committee. They also should be involved in the development of written policies that address capital asset reserves for renewal and replacement of vehicles. These policies support proactive financial management of the fleet and allow longer lead times for purchasing replacement equipment.

Actions that Fire Apparatus Manufacturers Can Take

The fire apparatus manufacturers can take steps to address the problems with fire apparatus cost and delivery. They should either take steps to increase production or stop taking orders. Due to several factors affecting the economy, it is hard to predict the cost of a fire apparatus over a four-year delivery time. In some cases, fire departments are being asked to pay deposits for vehicles and then have to pay unbudgeted additional costs over the time period for construction and delivery of the apparatus.

In addition, the manufacturers can promote the use of base-level vehicles that can be bought without writing specifications. They also could work with organizations like the IAFC to develop standard models for basic fire apparatus, like aerials, heavy rescue, brush trucks, or fire engines with suburban, urban, or rural variants. By purchasing these stock apparatus, fire departments could receive delivery of their fire apparatus in a shorter amount of time for less cost.

Actions that Congress Can Take

Congress also can play a role in addressing the problems with fire apparatus delivery and cost. In light of the need for refurbished apparatus to meet fire department needs, Congress should allow funds from the Assistance to Firefighters Grant (AFG) program to be used to refurbish fire apparatus. In addition, Congress should allow funds from the Staffing for Adequate Fire and Emergency Response (SAFER) grant program to be used to hire EVTs.

Also, we ask that Congress continue to support funding for the Assistance to Firefighters Grant (AFG) and SAFER programs (SAFER). Because the costs of fire apparatus continue to increase, the AFG program will help local fire departments to afford to replace fire apparatus when necessary. The grants are awarded to the local fire departments and require a local match.

We also recommend that Congress work with the fire apparatus industry to incentivize ways to increase the number of fire apparatus being produced. Since there currently is a surge in fire apparatus orders, Congress should look at tax incentives and other ways to allow fire apparatus manufacturers to make capital investments and maintain their workforce as a reserve capacity for future surges of orders. In addition, the Trump Administration and Congress can work with the parts manufacturers to prioritize the delivery of semiconductors, chassis, engines, and other fire apparatus components to both the fire apparatus manufacturers and the EVTs that maintain

existing fleets. Because the fire apparatus market is so small, it may need the federal government's help in making sure that its needs are met.

In addition, the U.S. Fire Administration (USFA) can work with the national fire service organizations and fire apparatus manufacturers to develop standardized models for the basic models of fire apparatus. The fire apparatus manufacturers could build these standardized models en masse in the effort to reduce delivery times and costs. These models would be voluntary: a fire department could still order a custom-built vehicle – it would just cost more and take more time to deliver. In addition, the National Fire Academy can develop model education programs to help technical colleges train more EVTs.

Conclusion

Thank you for the opportunity to testify at today's hearing about the increased cost and delivery times for fire apparatus. This is major problem facing fire departments today. The escalating cost of fire apparatus is hurting fire department budgets and their operations. The delayed delivery times are forcing fire departments to use apparatus that may be close to end-of-life and do not meet current safety requirements. These problems are endangering the safety of local communities. The solution to this problem is for fire departments to take actions to limit the surge in orders for expensive custom-built fire apparatus. The fire apparatus manufacturers must increase and streamline the production of vehicles. The federal government can play a role in resolving this problem by working with the manufacturers and their customers to develop models of various fire apparatus that can be purchased with a streamlined delivery process. By working together, we can resolve this problem and ensure the safety of all Americans.

I thank you for your time and am available to answer any questions that you may have.



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Appendix E - 2025 Urban Fire Forum (UFF) Position Paper

Support for the establishment of a National Fire Apparatus Specification

In the United States (US) and throughout the global fire and emergency service landscape, fire departments are facing an apparatus procurement crisis. No fire service organization, whether volunteer or career, rural or metropolitan, has been immune to the effects of this crisis, which is impacting jurisdictions of all sizes. These effects are evident in skyrocketing apparatus costs and delivery times that have doubled or tripled, resulting in a procurement system plagued by inequities, inefficiencies, and unsustainable practices.

To address this, the Urban Fire Forum is advocating for the creation of a National Fire Apparatus Specification (NFAS), fire service-led approach to apparatus design and procurement. This initiative is not intended to limit the innovation found in current specification processes that reflect each community's unique needs. Instead, it aims to learn from the challenges facing fire and emergency services and offer a strategic alternative to today's unsustainable models. We believe that through the strength and collaboration of leading fire service organizations, an NFAS can become a catalyst for lowering costs, reducing delivery times, improving transparency, enhancing disaster response capabilities, and aligning training and maintenance practices across the industry. Just as much of our firefighting PPE and equipment doesn't need to be custom-made to offer utility or protection, not every apparatus must be fully customized to deliver exceptional service.

To provide historical context, the current situation can be traced to the pre- and post-COVID eras as key turning points. Before the COVID-19 pandemic, from roughly 2011 to 2019, the apparatus manufacturing industry experienced relatively stable trends in cost, production, and purchasing.

- Pumpers or fire engines typically required eight to twelve months for production.
- Aerial units had lead times of twelve to eighteen months.
- Specialty units took even longer, with lead times ranging from eighteen to twenty-four

months. In 2020, the COVID pandemic triggered an unexpected disruption to what had been a predictable emergency vehicle procurement process. By 2021, the fire service began to feel the effects in several critical areas:

- **Work Stoppages** – According to the Fire Apparatus Manufacturers Association (FAMA), pandemic-related work stoppages disrupted production, resulting in a 12.2% decline in truck sales.
- **Supply Chain** – During the pandemic, manufacturers struggled to source essential components like microchips, electrical connectors, and commercial chassis. These persistent shortages delayed production in both the automotive and domestic fire apparatus industries, worsened by suppliers prioritizing the automotive sector over fire apparatus manufacturers.
- **Regulatory Changes** – In early 2022, engine manufacturers announced that new EPA engine emission standards would take effect in 2027. These changes, combined with limited production capacity, added further strain to the system.

These factors and announcements prompted fire service organizations to place an unprecedented number of orders, further compounding supply chain and production challenges. In 2020, the COVID Pandemic ushered in an unforeseen disruption to what had been a predictable emergency vehicle procurement process. Beginning in 2021, the fire service began to see the impacts and challenges in several key areas.

In May 2025, *Reuters* published an article titled "*As fire truck prices hit \$2 million, US firefighters demand an antitrust probe.*" The article highlighted that apparatus costs had doubled over the past decade, with delivery backlogs stretching up to four years. The International Association of Fire Fighters (IAFF) called for an antitrust investigation, citing industry consolidation as a key factor. Manufacturers, meanwhile, attributed the crisis to global supply challenges, inflation, and unprecedented demand.

Fortunately, this Urban Fire Forum position paper is not intended to choose between our valued partners at the IAFF or the truck manufacturers represented by FAMA. Rather, it seeks to present the rationale for a nationally recognized, publicly accessible fire apparatus specification, available for direct procurement through national cooperative contracts and purchasing consortiums. This is not a rejection of innovation or department-specific needs. Instead, it is a forward-looking initiative to introduce a viable and scalable alternative to the excessive costs and unsustainable delays that define the current procurement landscape, and to offer solutions. We believe that a National Fire Apparatus Specification can be one of those solutions.

When assessing solutions to the apparatus procurement crisis, we must be introspective and highlight some areas of the production process that the fire service can control. One of

those areas is the high level of customization amongst fire service organizations and their apparatus. According to the National Fire Protection Association (NFPA), there were 29,452 fire departments in the United States as of 2020. While there is no publicly available data on the number of custom apparatuses purchased each year, trends suggest that approximately 30% of the total purchased are custom apparatuses. This is likely because career and combination departments are more likely to buy custom apparatus, whereas volunteers often opt for commercial chassis due to budget constraints. If 30% of the fire service were to buy an apparatus in any one year, this would equate to 8,835 unique models. The number of distinctive models in the fire service could be much higher, as specifications can change between buying cycles. By contrast, there are approximately 400 unique models in the domestic car market, with 40 different vehicle brands available.

Henry Ford once said, *“You can have any color you want as long as it’s black,”*. The reason behind this statement was that, from a production standpoint, a low level of customization was efficient, fast, cost-effective, and streamlined the production process.

The question becomes: given the current state of the fire apparatus procurement crisis, how can the fire service find efficiencies in a system characterized by:

- **Escalating Costs and Delays** – Custom fire apparatus routinely exceeds \$1 million per unit, with production times surpassing 36 months. Even with modest production increases, manufacturers continue to struggle to meet post-COVID demand.
- **Budget Strain and Operational Impacts** – Due to rising costs and delays, capital reallocations have impacted or could impact frontline services through hiring delays, deferred equipment upgrades, and reductions in community programs to finance apparatus purchases that now consume a larger share of limited budgets.
- **Excessive Customization Limiting Efficiency** – Highly customized local apparatus specifications complicate manufacturing workflows, increase change order risks, and hinder parts standardization and economies of scale. They also require more complex training and maintenance, and reduce interoperability due to a lack of uniformity, even within the same jurisdiction.
- **Manufacturer Stock Program** – While offering some benefits in cost and delivery time, manufacturer stock programs are proprietary and subject to dealer control.
- **Disaster Response Interoperability** – During disasters (wildfires, urban conflagrations, hurricanes, tornadoes, flooding), mutual aid efforts may be hindered by incompatible apparatus with unique pump panels, hose layouts, lighting systems, and other components, often requiring deployment of specialized parts and mechanical support staff.

Recommendations

1. Establish a National Fire Apparatus Specification Task Group

Led by the Metro Chiefs, IAFC, NFPA, and IAFF, and composed of fire service leaders, engineers, manufacturers, procurement, and finance subject matter experts.

2. Develop a Tiered System of Modular Specifications

Create scalable, tiered NFAS models for urban, suburban, and rural departments, with menu-based, interoperable option packages.

3. Integrate the NFAS into National Purchasing Cooperatives

Partner with Sourcewell, HGACBuy, and others to list the NFAS tiered models as a non-proprietary, pre-approved procurement option.

4. Advocate for Incentives and Grants

Promote the inclusion of NFAS in federal and state grant programs as authorized equipment and prioritize departments adopting the NFAS.

Call to Action

The Urban Fire Forum urges national and local fire service leaders to support the NFAS, collaborate, and help shape the future of fire and emergency services. Just as Henry Ford revolutionized the automobile industry, we can play a pivotal role in addressing the fire apparatus crisis through smart standardization.

By advancing a fire service-led solution, we can realign the current procurement system to enhance operational readiness, promote fiscal responsibility, and increase transparency, while providing the fire service with a reliable, cost-effective alternative to meet our all-hazards response responsibilities to the communities we serve.

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Appendix F – Department Level Apparatus Committee Charter

It is common practice for fire chiefs to appoint an apparatus committee to develop apparatus specifications as well as stay involved through the purchasing process. The manner in which the assignment of apparatus purchasing is delegated to a committee can have a sizable impact on the cost and construction timing of the apparatus. To achieve desired results, the apparatus committees should have expectations clearly communicated with a provision of oversight established before the process begins.

An apparatus committee charter is used to communicate the roles and responsibilities of the group along with the instructions for their assignment. A charter can be thought of as “building the sand box” that the committee is authorized to operate within.

If cost containment is an important consideration, then the responsibility to obtain the best value for required apparatus functions should be stated in the charter.

Information on committee charters is readily accessible through internet search.

Components of an apparatus committee charter should include;

1. Purpose

2. Authority

3. Membership

- **Composition**
- **Qualifications**
- **Term**
- **Chairperson**

4. Responsibilities

5. Meetings

- **Frequency**
- **Quorum**
- **Meeting Notes**

6. Reporting

7. Review of Charter

Specific apparatus committee points to consider may include;

- Detailing the limits of vendor input.
- Identification of prohibited specifications that will risk vendor competition.
- Identification of department support to the committee,
- Instructions for regional purchases or other group purchasing arrangements if warranted.
- Include who the committee reports to.
- Frequency of briefings to senior staff.
- How apparatus should be standardized against the existing fleet.
- Should the committee consider stock apparatus.
- Categorizing each spec as either a must have (requirement) or nice to have (optional) with justifications.

- Include budget limitations. The committee may be charged with value engineering a set of specifications to bring down costs.
 - The committee should conduct a post project analysis to document lessons learned from the process and requirements identified that should be applied to future projects.
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Appendix G - Special Thanks

THANK YOU

to the following organizations for their support and collaboration on this document

The task group intends to provide updates as new information becomes available

The task group also intends to provide conference presentations to include 2026 Fire
Rescue International

