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INSIDE:

- Specs
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Designing & Purchasing Your Next Apparatus



Photo by Matthew Sosnowski

Specification Verbiage: It's All in the Details **A4**

Tom Shand reviews the apparatus specification process, underscoring that operational efficiency, safety and maintenance are key in the process.

What Size Vehicle Is Right for Your Department? **A8**

Tom Shand addresses this critical question and offers suggestions related to multi-purpose vehicles, weight constraints and vehicle dimensions.

The Financial Side of Apparatus **A14**

Ed Ballam covers the financial side of apparatus, detailing financing options that will help your department get its money's worth.

Tankers, Tenders & Mobile Water Supply Apparatus **A18**

Mike Wilbur spotlights tankers and tenders, underscoring the need for fire departments to ensure that these mobile supply apparatus meet the necessary standards.

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**Designing & Purchasing
Your Next Apparatus**

INSIDE:

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ON THE COVER:
Thirty firefighters staffing six engine companies and two ladder companies responded to a fire at the historic Mt. Tom Paper Company mill in Holyoke, MA. Metal cutting during salvage operations is suspected to have sparked the fire.
Photo by FIREGROUND360°

Fire & Emergency Apparatus

By Tom Shand



Photo by Glen Ellman

Specification Verbiage: **It's**

Operational efficiency, safety and maintenance are key in the process

TOM SHAND, a *Firehouse*® contributing editor, is a 36-year veteran of the fire service. He works with Michael Wilbur at Emergency Vehicle Response, consulting on a variety of fire apparatus and fire department master-planning issues.

Today's apparatus specifications seem to go on forever. Many documents are more than 100 pages in length, calling out every dashboard gauge, seat and interior trim color and referencing the NFPA 1901 standard throughout.

Fire & Emergency Apparatus



Sliding hosebed covers permit personnel to operate these devices without having to climb on top of the engine prior to loading attack and supply line hoses. Always think safety when specifying stepping surfaces and points of access on the apparatus.

Photo by Tom Shand



Well-designed hosebeds, such as Engine 55 from the Freeland, PA, Fire Department, are the result of detailed planning and specifications to determine the safe placement of handrails and stepping surfaces.

Photo by Tom Shand

All in the Details

While the old expression “The Devil is in the Details” certainly has merit, it is not surprising to work with apparatus committee members who admit that they have not read the entire vehicle specification at any point in the design process. Further, we can probably all recall attending some apparatus committee meetings where the focus seemed to be on the color of warning light lenses and graphics design rather than on the chassis and body components that could enhance safety and improve vehicle performance.

Builder details

How we arrived here is largely due to changes in the manufacturing and build process that are common in the industry. Did you ever notice that no two apparatus manufacturers’ specifications follow the same format when describing the vehicle

components? Some may believe that this is done to discourage other folks from bidding; however, the real reason is that many apparatus builders use their specifications to develop the bill of materials and engineering required to successfully build the vehicle with all of the options requested by the department.

Virtually all apparatus builders use software programs to develop their specifications, which start out as base models with options for virtually every component on the vehicle. If your department has not acquired a new unit within the past three or four years, chances are that many of the specific model numbers and components have been upgraded and changed as technology moved forward. This is particularly noticeable with diesel engine and electronic components where federally mandated standards have influenced all types of automotive designs.

Fire & Emergency Apparatus



The underside of a fabricated steel front bumper. Note the front and side supports to reinforce this area. This style of bumper will protect the crew and rig in the event of a frontal collision. *Photos by Tom Shand*



Chassis air reservoirs should be provided with remote cables that permit personnel to regularly drain tanks.



Proper specification verbiage along with a close final inspection will reduce occurrences where excessive use of plastic wire ties are used to hold wire bundles in place.



Finish painted frame rails along with stainless-steel straps and hardware on chassis components will resist rust and corrosion in these important areas that are often overlooked.

Boiling it down

At some point in the specification-development process, the Word document can be distilled down to a component or strip-per list that ranges from 10 to 15 pages and calls out each of the major components in single-line fashion. This component list may then be used by some manufacturers for review at the pre-construction conference and final inspection as a means to go over the entire vehicle. While this practice can save some time, this does not mean that the formal specification should be forgotten; rather, this is the document from which the terms of the contract were stipulated, and it should be utilized throughout the build process for reference and to confirm that all areas of concern have been addressed.

Starting with the boilerplate portion of the specifications, these first pages of the document are most important as they determine the “rules of the road”—rules that should be developed with specific verbiage to favor the legal interests of the agency purchasing the vehicle. Many areas should be addressed here:

- Requirements for bidders
- Engineering information

- Pre-construction conference
- Final inspection
- Certification testing
- Terms of acceptance and payment
- Delivery training
- Warranty requirements

Each of these areas is critical for the fire department to discuss and determine the process by which bids will be evaluated for compliance as well as which specific design criteria or overall dimensions are important. All of these areas need to be addressed up front, before the committee debates the merits of single- vs. two-stage fire pumps or the size of the water tank, etc.

For example, most manufacturers have developed base models of pumpers along with several body lengths and compartment dimensions. In order to have some degree of uniformity, whatever the standard compartment depth or door height might be, these numbers are called out in the specifications—at times to two decimal points. While this works for that builder, not all manufactures may offer a compartment size to meet this specific requirement. For this reason, the specification should include a listing of the critical dimensions, including wheel-

Body rub rails should be positioned and spaced out to protect all components, including door hardware on roll-up shutter doors.



Consider using switches on the officer's side dash area to control warning devices to free up floor space.



Plan out the interior cab space to accommodate map books, EMS equipment, chargers and radio equipment. Note that the rear of the engine tunnel is covered with aluminum tread plate in this high-wear area.



Step surfaces at the rear tailboard should be provided with aggressive non-slip surfaces, particularly in areas that experience snow and ice conditions to reduce slips and falls from the apparatus.

base, overall length, height, width, length of the cab, bumper extension, rear step, body length and hosebed height from the ground. Each of these areas should list a minimum and maximum permissible dimension to permit a prospective bidder to offer a vehicle design to meet these needs.

In the cab

Cab design and components—such as frontal and side airbags, seating design and seatbelt hardware—have been developed to enhance the safety environment for the driver, officer and crew. Cab seating layout in the past was somewhat limited by the length of the cab and where the apparatus manufacturer determined the location of the forward-facing seats. With some departments operating with four to six personnel, it does not make sense to specify the longest cab available, which can add 12 to 18 inches of wheelbase, unless there are some specific requirements for interior EMS and tool storage. Several apparatus manufacturers have designed their cab with multiple positions for forward-facing seats that do not limit you to having two seats bolted to a seat riser within six inches of one another. Placement of seatbelt retractors and belt assemblies

has been designed to permit personnel to more easily buckle the seatbelt with full PPE without having to adjust their position. Given the continued number of fire/rescue personnel who are injured each year on apparatus, "Seated and Belted" should be the mantra of every fire department.

Remember the goal

When starting out on any new vehicle, it is important that the chief officers and stakeholders in the process determine the mission of the vehicle. This may seem simplistic, but there are many departments that, due to the inability to determine the principle characteristics of the apparatus, end up with a unit that was too large, overweight and underutilized.

Factors like fire station bay space; first-due response area roadways, terrain, bridges; gross vehicle weight limitations; and tools and equipment carried all have a dramatic impact on how the vehicle should be designed and, more importantly, how it will perform over the next 10 to 15 years. The specification process should be a programmed and detailed one for everyone involved. Operational efficiency, safety and maintenance provisions should all be addressed as the apparatus committee works through the process. ■

Fire & Emergency Apparatus

By Tom Shand

What Size Vehicle Is Right

Height

Pike pole and hook mounting on pumpers can be accomplished using the rear cab wall as is the case on Engine 15-1 from Shippensburg, PA. Note the aluminum tread plate step over the pump panel area.



The use of swing-out tool boards enables equipment to be mounted on each side with flexibility to be changed as needs dictate. Note the mounting of the floor-mounted saws and rear wall tools on the Camp Pendleton, CA, Marine Corps Base heavy rescue.

Length

Avoiding common mistakes when determining apparatus size

TOM SHAND, a *Firehouse*® contributing editor, is a 36-year veteran of the fire service and works with Michael Wilbur at Emergency Vehicle Response, consulting on a variety of fire apparatus and fire department master-planning issues.

Fire apparatus has evolved to a point where, in some instances, we are operating vehicles that are pushing the legal weight limits imposed for interstate highways. Vehicle dimensions, such as overall length and height, have become so large that the vehicle's physical size has made it difficult to work from, with attack lines and equipment that are literally out of reach of the average firefighter.

ht for Your Department?



High side body compartments can have pegboard or similar material provided in the reduced depth sections to permit mounting of hand tools and appliances.

The pump panel area on this Syracuse, NY, engine was laid out to provide a logical space for all components as well as maintenance access on each side of the vehicle. Note the non-slip, full-width pump panel step surface.



The clear width of compartment openings should be determined when laying out equipment mounting inside of slide-out trays. Note the efficient use of space to mount the forcible entry tools.



Further, recent anthropometric studies have concluded that the 95th percentile of firefighters do not fit well into current cab seating, which also impacts the position and location of handrails and stepping surfaces.

The multi-purpose approach

We can all probably remember viewing a piece of apparatus and thinking to ourselves, “Why on earth did they do that?” The level of customization on fire apparatus is largely dependent upon the perceived needs of the department as well as the manufacturers’ ability to develop new and innovative components that catch our attention. While not to demean their capabilities on the fireground, combination apparatus, such

as rescue engines and quints, have fostered the concept that departments can combine a number of components, tools and equipment into one vehicle that will bring the entire toolbox to the incident. As a result, many all-hazards agencies have embraced the multi-purpose apparatus as the answer to their needs to carry the majority of their equipment on a single unit. The question then becomes when does a piece of apparatus become too large and cumbersome to operate, either within the first-due area or in other neighboring jurisdictions. In part, the size of apparatus is related to our staffing models and deployment practices. Where many departments are fortunate to provide four-person staffing on engines and trucks, all too often we operate with less-than-optimal staffing, which results

Fire & Emergency Apparatus

in five to six units at the scene with 12 personnel tasked to do everything. This common scenario has caused some departments to acquire multi-purpose apparatus to carry more tools and equipment on a single unit. These combination units may work well in wide-open areas in front of strip malls, but in some communities, the square footage of residential homes has grown to the point where the life safety and fire potential is a greater concern. This is further complicated when roadway access for apparatus is limited due to driveway layout, grades and decorative stonework. More than ever, apparatus committees must evaluate the service needs of their first-due areas and temper this with some practical application of situational awareness to provide for a well-designed apparatus.

Weight issues

The NFPA 1901 standard (Table 12.1.2) provides some excellent guidance as to the minimum equipment payload weights that should be considered for the various types of apparatus. For example, for pumpers with enclosed compartment space of less than 250 cubic feet, the minimum equipment allowance is 2,000 pounds and increases to 2,500 pounds for larger bodies. As these payload allowances are a minimum, the fire department must clearly identify their requirements for hose, tools and appliances when developing their specifications. Combination apparatus such as rescue-engines and single-axle quints are particularly vulnerable for being overweight if the equipment weight has not been determined early in the process.

Overweight fire apparatus is not limited to combination apparatus or any particular style of vehicle. Unfortunately, there are many pieces of apparatus operating today that are overloaded, as the equipment complement was not specified and, over a period of time, additional tools were mounted on the apparatus, potentially resulting in poor braking and vehicle performance. Over the past three years, as a result of numerous fleet studies, many departments have been surprised to learn that after each of their units were weighed on certified scales, one or more vehicles were overweight, in some cases with no personnel on board. Some units had to be taken out of service, with changes in equipment and hose complements, reduction in water tank size or new axles, tires and suspension components installed.

During the specification process, the apparatus committee should review the tool and equipment requirements, starting with an inventory of existing apparatus. While the NFPA 1901 standard lists basic equipment requirements for engine, ladder and special service units, this equipment loading typically does not capture all of the tools and appliances that departments will require on their front-line units. For example, it is one thing to call for a hydraulic rescue tool compartment to include reels and slide trays and another to detail the specific make, model, size and weight of this equipment to ensure that sufficient compartment space and weight is available to safely carry these tools.

Dimension details

Most apparatus manufacturers have developed body designs with specific compartment dimensions based upon the capacity of the water tank and hosebed to provide different lengths in order to meet departments' needs. The apparatus committee should inquire as to the various options to determine the best match for the overall length of the body and how this may impact the

wheelbase and turning radius. Departments often simply choose the largest body size available and then work backward to make the tools and equipment fit within the available space. This often results in mega-sized apparatus that carries everything but does not allow access to tight areas within the community or simply cannot maneuver in locations where older vehicles could easily fit.

When reading through manufacturers' specifications, remember that all dimensions are not necessarily equal. Some specifications state the overall compartment dimensions in inches for the height, width and depth of each area. These numbers, while impressive, may not take into consideration the loss of height due to headers or the roll-up shutter and the clear door opening past hinged doors or trim pieces. In addition, the depth of each compartment should be the clear useable space for equip-

ment storage with the door closed. The use of slide-out trays for easier access to equipment must allow not only for the height of the slide mechanisms and thickness of the tray itself but also the side clearances required to pass through the door opening. Some of these dimensions are not normally detailed in specifications provided by the manufacturers and will have to be determined after consultation with sales personnel and engineering staff.

After the specific compartment dimensions are established, you can begin to lay out your tools and equipment within each compartment area. If you have already developed the apparatus inventory of equipment, there are several methods that you can use to lay out each compartment shelf, tray and tool board space. Several manufacturers and equipment-mounting companies can provide a computer-aided drawing (CAD) for each area within the compartment body. These CAD drawings can be of great assistance before any metal is sheared to ensure that your equipment can be safely mounted in each location.

Another technique that can be accomplished in the fire station is to mark out on the apparatus bay floor with tape each surface area, such as an adjustable shelf, tray or wall area, and locate the desired equipment within the space. Documentation of this work should include digital images and a listing of the appliances and equipment for each location.

The work conducted at this point in the design process can alleviate some of the issues that crop up later and cost a great deal of time and money to solve once the apparatus goes into production. This work is particularly important if your department is designing an apparatus that will combine the equipment



This shows an efficient use of walkway storage on this heavy rescue for roof hooks, 16-foot roof ladder, 28-foot extension ladder and small attic ladder.

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from several pieces of apparatus into a single unit. The apparatus manufacturer will be able to validate your requested tool and equipment locations while providing an accurate analysis of the anticipated in-service weight of the apparatus prior to construction. Failure to provide this level of detail during the design phase can lead to unbalanced side-to-side weight or overloaded apparatus that, in some cases, cannot be easily modified for overall vehicle safety.

Sample text

One of the requirements within the specification boilerplate should be for each bidder to provide a detailed weight analysis of the apparatus as proposed. This analysis would provide information on the front- and rear-axle loading based upon the weight of the equipment provided by the fire department. This analysis would then be compared to the actual vehicle weight when delivered to the department and, prior to acceptance, the vehicle would be weighed with all hose, tools and equipment to ensure that the vehicle is within the rated axle and chassis gross vehicle weight rating (GVWR). Typical specification verbiage would read as follows:



A combination of slide-out trays, fixed shelves and modules provided space for ventilation equipment on this San Diego ladder truck.

“Each bidder’s proposal shall provide a complete weight analysis indicating the estimated front- and rear-axle weights for the loaded vehicle including full fuel, water and foam tanks, six personnel, the specified hose load and a minimum of 2,500 pounds of tools and equipment. This analysis shall detail the weight of the major components, hose and equipment showing the weight applied to each of the vehicle axles. A general statement indicating the front and rear delivery weights from the factory shall not be considered as acceptable.”

While tool and equipment mounting is one of the last items to accomplish prior to placing the unit into service, you must consider how this work is going to be conducted.

Some departments have historically left this work to the individual fire companies, with mixed results. Others have tasked this work to be conducted by the department shops and mechanics to provide some standardization in tool and equipment placement. Apparatus committees should consider including a specific amount for tool and equipment mounting into the final specifications to ensure that the complete inventory will be properly and safely secured in the cab and body compartments.

A statement similar to the following could be included:

“Each bidder shall include an amount of seven thousand dollars (\$7,000) for tool and equipment mounting of fire department supplied equipment including hydraulic rescue tools as listed in the attached specifications. The tool mounts, whether custom fabricated or commercially purchased hardware, shall be approved by the fire department. All tools shall be made available to the successful bidder after completion of the final inspection and shall be mounted under the supervision of the fire department prior to final acceptance and payment for the apparatus.”

When working on new apparatus specifications, the department should develop a complete equipment inventory and plan the space allocation needed to safely accommodate and secure this equipment. Don’t fall into the trap of acquiring the largest body style available with the hope that everything will work out. Considering the life cycle of the apparatus, while leaving some open space for future equipment, the cost of tool and equipment mounting is nominal when compared to some of the more costly components that are installed on new units.

Careful planning pays off

With the increasing services provided by many departments, the apparatus compartment space can be at a premium within a short period of time after placing the vehicle into service. Careful planning during the specification process, including developing the hose, tool and equipment inventory, will reduce the likelihood of your department ending up with an oversized apparatus with weight and performance issues. ■

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Fire & Emergency Apparatus

By Ed Ballam

The Financial Side of Apparatus

Know the financing options available to your department
to get the most for your money

ED BALLAM is the industry and products associate editor for *Firehouse*[®], a captain with the Haverhill Corner, NH, Fire Department, and a National Registered EMT. He is also a Deputy Forest Fire Warden for the New Hampshire Division of Forests and Lands. Professionally, he's been a journalist for over 30 years, working for a variety of publications, including serving as managing editor of a national fire service trade journal for more than a decade.

Firefighters can spend months, even years, selecting the apparatus they want, the options that are necessary and even the color and logos. That's fine when one considers that some apparatus can be in service for decades; however, proportionate effort needs to be given when considering the financial side of apparatus purchasing.

Plan the purchase

How to pay for an apparatus, when to purchase it, and the funding sources can all weigh heavily in the decisions a truck committee or a purchasing agent makes. "Funding is a critical issue," says Phil Gerace, director of sales and marketing for KME Fire Apparatus. "... I don't know that there's a one-size-fits-all solution, but the important thing is to have a plan."

There are myriad options fire departments should consider when making financial decisions. The simplest plan is to save money and pay cash for apparatus when it's time to make the purchase. Paying cash means municipalities save money that would usually go to interest and lease payments. Manufacturers sometimes offer discounts for cash transactions because they get their money quicker and cleanly.

Gerace says it's important for communities to remember to time the arrival of their apparatus when the money is available. He points out municipalities will have to pay penalties on CDs if they have to withdraw money to pay for the apparatus that arrives months earlier than anticipated.

While some communities may have CDs and bank accounts laden with funds, many can't come up with the money to pay for apparatus up front, especially with custom pumpers tipping the scale between \$400,000 and \$500,000 and aerials often exceeding \$1 million. That leads communities to run apparatus far in excess of its lifespan. Apparatus purchases can be delayed for years while community leaders wrestle with whether to replace a dump truck for the highway department or make improvements to sidewalks with the need for a new fire truck.

Gerace recommends communities come up with a "structured apparatus replacement plan" that will allow fire departments to plan ahead and get trucks when they are needed—and when the funding is available. "We often see departments waiting until the trucks are ineffective and they have to make emergency purchases," he says. "That's because they don't have a coordinated replacement plan."

Loan programs

When saving money for apparatus isn't an option, some communities opt to borrow the money through a variety of loan programs, much like home or auto owners would do to make large purchases.

Fire departments can borrow money through local banks that are often willing to provide low-interest loans because they are part of the community and have a spirit and a willingness to serve the area in which they do business. There's also another practical reason for banks and lending institutions to offer discounted loans: taxes.

Tom Whitmer, director of business development for Oshkosh Corporation, the parent company of Pierce Manufacturing, says most municipalities qualify for tax-exempt financing. "That's when the customer doesn't pay taxes, and the lender doesn't pay any taxes on the loan," Whitmer says, noting that communities can receive rates that are 65 percent of what businesses would pay in interest. "The reality is municipal customers are cheaper when it comes to taxes," he says, adding that lenders can then pass that savings on to communities seeking loans.

While a loan, through bonding, is a good way to get the

money communities need for apparatus, it does obligate the department to long-term debt and subject it to any penalties for default. "Default is a bad thing," Whitmer says. "It can lead to litigation and all sorts of legal problems." Default on municipal bond loans is rare, but it does happen, he says, pointing to Detroit as an example.

Bonds and loans can also accumulate as multiple projects and purchases are funded over years and affect communities' debt limits, Whitmer points out.

There comes a time when communities hit debt ceilings and can borrow no more, which can limit future plans. It's best to look at debt holistically when considering apparatus purchases and think about the highway department's need to purchase a high-dollar road grader, for instance. That will keep communities from hitting that debt ceiling when critical purchases need to be made and there's no way to borrow money to make the purchase.

Even with some of the limitations built into borrowing, municipal bonds are solid solutions for departments to get

Financing Options Compared				
Characteristic	Municipal Tax-exempt Lease	Loan	Tax-exempt Bond	Certificates of Participation
Interest Rate	Low tax-exempt rates	Low tax-exempt rates	Low tax-exempt rates	Low tax-exempt rates
Creates long-term debt?	No	Yes	Yes	No
Eligible Equipment	Essential Use	Government Use	Government Use	Essential Use
Speed of Implementation	Days to Weeks	Days to Weeks	Longer as voter approval is needed	Weeks to months
Up-front costs	None	None	Legal expenses, filing fees, costs of referendum	Legal expenses, filing fees, etc.
Cancelable if future appropriations are not approved?	Yes	No	No	Yes
Ownership Risk	Lessee	Borrower	Issuer	Lessee
Initial and Ongoing Disclosure Required?	No	No	Yes	Yes
Purchase Option	\$1.00 buy out at end of term	N/A	N/A	\$1.00 buy out at end of term

This chart compares financing options (leases, loans and bonds) and some of the impacts on the department and community. Information Provided by Oshkosh Corp.

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Lease-purchase options

A third consideration is lease-purchase options. Many manufacturers, especially the larger ones, offer this option, and there are many third-party companies that will offer the same service, allowing communities to purchase virtually any apparatus they desire.

The lease-purchase option is a little more expensive than a municipal bond because of the risk involved for lessors, but experts say it can still be cheaper than deferring purchases. That's because

Average Price Increases

Year	Cost: 2014 Pierce Pumper (for example purposes)
2014	\$550,000.00
2015	\$566,500.00
2016	\$583,495.00
2017	\$600,999.85
2018	\$619,029.84
2019	\$637,600.73

Note: On three- and five-year lease terms, total payments are less than cash price at year 2017.

Average price increase if the City chooses to wait and buy in the future (assumes a steady annual price increase). Information Provided by Pierce Mfg.

the inflation rate is higher than the current lease interest rates.

Gerace says, like municipal bonding, municipal leasing is tax free and far less expensive than commercial leasing. "And with a lease, departments usually end up owning the apparatus," he says. "Right now, the interest is less than inflation. So, departments that are waiting are actually losing buying power."

Whitmer agrees and says departments that defer apparatus purchases, rather than borrowing money or entering lease agreements, will probably spend more to purchase the same apparatus than if they bought it now and paid for it with some sort of financing. "The logic of leasing is you don't have to come up with \$500,000 today," Whitmer says. "You have to come up with \$78,000 over a seven-year term and then you'll own the truck." Depending on the lease agreement, some departments might have to come up with a "balloon payment" at the end of the agreement to purchase the apparatus.

Whitmer says that some manufacturers, like Pierce, offer a lease turn-in program where communities can pay for the use of the apparatus for a designated time, usually seven to 15 years, and have the option of letting the manufacturer take it back. Participating communities can usually expect to pay about 80 percent of the cost of the truck, he says.

"Flexibility in the fleet is the logic of a turn-in lease," Whitmer says. "You can run the trucks and get out of them." He adds that some communities that have low run numbers and keep their apparatus for 30 years in pristine condition might not real-

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ize much benefit out of such an agreement. However, the bigger communities that are tough on apparatus might realize significant savings and flexibility, he says.

Whitmer says the department that uses the lease turn-back option can avoid the “hockey stick of maintenance” when the cost of keeping the apparatus on the road goes from flat to virtually straight up on the ledger.



The lease-purchase option is a little more expensive than a municipal bond because of the risk involved for the lessors, but experts say it still can be cheaper than deferring purchases.

“At some point, the maintenance racks up on them,” Whitmer says, noting that some fire departments are very good at finding “the sweet spot” where apparatus have high resale values, and the community avoids steep maintenance costs.

One other benefit of lease agreements, Whitmer explains, is most don’t require a voter referendum to enter. They’re considered a cost of doing business and can be placed into operating budgets, he says, adding that a lease is not long-term debt and doesn’t require approval by voters.

Because of that, leases can often be executed quickly, and departments can have apparatus in service sooner with less cost. That’s because all the costs and time spent on voting preparation is avoided, Whitmer says. Also, it helps communities avoid the debt ceiling and keeps cash and borrowing power available for other needs, he adds.

Other options

Gerace says there are other important funding sources that shouldn’t be overlooked. Grants, for instance, can help any community make apparatus purchases, he says, adding that local, state and federal organizations have money earmarked for apparatus.

Communities should also look to developers constructing large residential or industrial projects for help funding apparatus, Gerace says. Many are willing to contribute to apparatus purchases to help protect the community and cover the costs of the growth they are generating, he says.

Additionally, casinos, petrochemical plants and other industries are ready and willing to provide funds for fire protection, Gerace says, noting that it’s worth exploring all avenues to come up with cash for apparatus.

The art of the purchase

“There’s a lot of art to it,” Whitmer says of apparatus financing. “Every department is different and every department is going to have different needs. Communities have options and they have to analyze them to figure out what’s best.” ■

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Fire & Emergency Apparatus

By Mike Wilbur

Mobile water supply apparatus can be critical to our fireground operations so it's important that they meet the requirements set forth by the applicable standards.

Photo by Jay Bradish



Tankers, Tenders & Mobile Water Supply APPARATUS

Ensure your apparatus meet the necessary standards

M

any years ago, I had the privilege of working on the lesson plan for the New York State Water Supply program. During that time, I learned much about rural water supply in general and tankers and tenders in particular. Some of what was learned was completely by accident.

MICHAEL WILBUR, a *Firehouse*® contributing editor, recently retired as a lieutenant in the New York City Fire Department, where he was last assigned to Ladder Company 27 in the Bronx. He has served on the FDNY Apparatus Purchasing Committee and consults on a variety of apparatus-related issues around the country. For further information, access his website at www.emergencyvehicleresponse.com.

Fill & dump rates

The NFPA standard for tankers/tenders states that these apparatus must be capable of being filled at a rate of 1,000 gpm and must be able to be emptied or dumped at the same rate of 1,000 gpm, at a minimum. How can you check your tanker/tender to ensure this kind of performance? Well, it is pretty easy. If you have a 3,000-gpm tanker/tender and a watch, then you just have to time it. If you can fill and dump the apparatus within 3 minutes or less, then you've met the standard.

But how do you know if all of the water is being emptied when you arrive at the dump-site? You don't know unless you check it. As we were piloting the State Water Supply Course, we stumbled onto a very real problem. We found tankers/tenders that were only capable of dumping 87 percent, 84 percent and even one that was only dumping 71 percent of the water. What does that mean in a practical application? If you have a 3,000-gallon tanker/tender and it is only dumping 71 percent of water, then the apparatus is only capable of delivering 2,130 gal-

Fire & Emergency Apparatus

lons of water, and you are constantly transporting the same 870 gallons of water over the road. There are many reasons this might be occurring, including problems with the baffles or the sumps, or perhaps the tank design or an engineering mistake.

How can you check to make sure your tanker/tender is actually dumping all its water? First, make sure the tank is full. Next, take the vehicle to get weighed. Then dump all the water you can and weigh the truck again. Water weighs 8.34 pounds per gallon, so if you have a 3,000-gallon tank, then the apparatus must weigh 25,020 pounds less than the initial weight.

Check the weight

Before you take delivery of and pay for any new fire apparatus, you must fill the vehicle with all equipment and fluids and weigh it, as outlined in NFPA 1911, Section 16.2.3. If it is at all overweight, then you cannot accept the vehicle until the manufacturer comes up with a remedy. If there is not a remedy, then you simply do not buy the vehicle.

With new tanker/tenders, it is extremely important that the apparatus is delivered to you completely empty and with all the



Tankers/tenders must be capable of being emptied or at the rate of 1,000 gpm, at a minimum. Photo by Jay Bradish

equipment and a full tank of fuel. This is when and how to weigh the vehicle. You then need to fill the water tank and weigh it again, and then dump the water tank and weigh it again. You can then check those two items—weight and dumping rate—off your delivery acceptance list.

As you are filling and dumping the tank, it is advisable as part of the acceptance testing to time it to make sure that the apparatus can meet the NFPA standard of dumping and loading at a rate of at least 1,000 gpm.

Get what you paid for

Many fire departments are not doing any kind of acceptance testing upon delivery. This is a big mistake. The NFPA standard has acceptance requirements for all kinds of apparatus. If you find that you have a 1,500-gpm pump that, upon delivery, cannot deliver that required flow, then you can send the unit back to the manufacturer and the unit can be fixed under warranty. However, if you wait until the first in-service pump testing, the unit may be out of warranty and the fire department may have to pay for any repairs. The key here is to make sure you are getting what you paid for. ■



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