

# **FIRE**RESCUE

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***Rural Fire Command***

by

***Larry Davis***

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**WOW Operations**

***Are they tankers or tenders?***



# RFI

RURAL FIREFIGHTING INSTITUTE

*Training America's Rural Fire & Emergency Responders*

## A Message the Author, Larry Davis

In October 2002, I started writing the monthly “Rural Fire Command” column for *FireRescue Magazine*. Since that time, the RFC column has been carried in just about every subsequent issue of the magazine.

As time has passed, several readers have contacted me about obtaining back issues of the column. Some expressed an interest in acquiring the articles in Powerpoint format for use in training programs.

This led to, my adaptation of the RFC columns to the PowerPoint format. These PowerPoint programs are being made available through the combined efforts of *FireRescue Magazine* and the Rural Firefighting Institute.



# **WOW Operations**

## ***Are they tankers or tenders***

If there's one fire-service operation that separates rural firefighting from urban firefighting, it's the water-on-wheels (WOW) operation, which utilizes various types of tank vehicles to haul the wet stuff to the red stuff.

Firefighters who don't use WOW ops on a day-to-day basis may think they're haphazard at best and no match for a municipal water system with those funny looking spigots (called "fire hydrants") attached. However, firefighters—rural or suburban—who routinely use WOW ops know they often provide higher delivery rates than many hydrant systems.

Over the years, I've witnessed numerous occasions in which rural departments that use WOW ops were called in to help our urban brothers and sisters when city water systems failed or when their delivery capability simply gave out during a major incident. The WOW op is a key water-transport operation that should be part of every incident commander's tactical toolbox, regardless of whether a municipal water-supply system is available or not.





**Figure 1.** This illustration depicts how fires were fought during colonial times, and it clearly shows two distinct systems in use. The line of people forming the “bucket brigade” are the water-transport system — the system responsible for getting water from the source to the fire-attack system — the people and equipment discharging water onto the fire. This illustration also shows the beginnings of WOW operations. The only difference between colonial WOW ops and modern-day WOW ops: Tank vehicles have replaced buckets. And as shown, whether you use buckets or tank vehicles, water transport requires more people and resources than fire attack.





**Figure 2.** Although these vehicles vary greatly in design, they all share one thing in common: Departments designed them to haul water to fires to supply rural fire-attack operations. From the first time fire departments used tank vehicles to haul water to fires, these vehicles have been called **tankers**.



# The Great Debate

The most important part of any WOW operation: performance, or the gpm delivered. However, as is often the case in fire-service ops, we tend to get more hung up on WOW terminology than we do on performance.

Figure 2 shows four tank vehicles historically called “tankers.” In recent years, with the emergence of the wildland firefighting business and the National Incident Management System (NIMS), a conflict has emerged over tank vehicle terminology, or more specifically, whether we call the vehicles shown in Figure 2 “tankers” or “tenders.” The conflict stems from the fact that wildland firefighters use the term “air tanker” to refer to aircraft that make water drops on wildfires, and the term “tender” to denote a truck used to haul water during ground operations or to re-supply air tankers.

For more insight into this debate over tankers and tenders, we must revisit the words of our fire-service Godfather, Alan Brunacini, Chief of the Phoenix Fire Department.



# Tanker or Tender? Who Cares?

*From “Chief’s Perspective” by Chief Brunacini, Firefighters News, Aug/Sept 1996.*



Is it a tanker, a tender, or a mobile water supply apparatus?

*The “Flying Tankers” article in the April/May issue reminded me of a part of incident command development that has always seemed goofy to me. I have always wondered why we would name firefighting aircraft “tankers” and rename fire trucks, whose function is to haul water (traditionally called tankers) as “tenders.”*

*In his excellent article, McFadden and Hawkins state that there are about 50 such aircraft in service within this country. I recently asked a well-informed, experienced national fire apparatus manufacturing executive how many water carrying trucks (i.e., old time “tankers”) he thought were in service within the United States. He estimated around 20,000. (Author’s Note: I bet it is at least 40,000).*



It's an ~~air tanker~~ a BADLOW



# Tanker or Tender? Who Cares?

*I realize an important part of ICS is that we all hold hands and begin to standardize what we call stuff, but it doesn't make a lick of sense (at least to me) to rename thousands of vehicles we use every day of the year on a variety of fires throughout the country and then use that common, widespread and descriptive name to identify only 50 special airplanes (50 airplanes!) that are used only during a relatively short season and on only one kind of fire (wildland).*

*I wonder if the wildland ICS group (or division) that created this change imagined the structural firefighting community would notice something was up when they had to regold leaf "tender" on the doors of their old time "tankers" (20,000 rigs x 2 doors x 200 bucks a door = \$8 million). Another part of this "wagging dog" process is that from an operational/command standpoint, the average "tender" will never get the chance to look up in the smoke-filled sky and see a "tanker" do a fly over and agent drop, so the change will make even less sense to the participants on the ground. My suggested solution is for us to keep calling tankers tankers and for the wildland firefighters to use the new term "BADLOW," which means Big Aircraft Dropping Lots of Water.*

*I realize this issue will not have much real impact on world hunger or global warming—it only involves an old guy trying to make sense out of the changing fire service world.*



# Bruno's *BADLOW*



**BADLOW** = *Big Airplane Dropping Lots of Water*



# Classification of Water Tender Types

Figure 3 lists the National Wildfire Coordinating Group's (NWCG) classifications for water tenders used in wildland firefighting, which are printed in the NWCG's *Fireline Handbook*. As you can see, there's no specification for tank off-loading performance. The objective of a tender is to have lots of water available but to allow the water to last a long time through the use of a small pump. If firefighters use these tenders for structural firefighting with only the pumps available, they cannot deliver the 500–1000 gpm required for fighting structure fires or dealing with hazmat incidents.

On scene, fire departments focus on having lots of water available and small pumps to make the water last a long time. A 5000-gal water tank and a 300-gpm pump are of little value at a structure fire that requires a 1000-gpm delivery rate. Water tenders are designed to conserve water, but that's not the objective during a structure fire where property conservation and firefighter safety require big water. Any water remaining in the tank when the structure is gone should indicate the operation was not successful.

Personally, I don't care what you call a tank vehicle that's used to haul water, as long as that vehicle can move the water needed to where it is needed, when it is needed. Performance—not the name—is what counts.




## Figure 3. Classification of Water Tender Types

<b>Tender Type</b>	<b>Pump Minimum Size (gpm)</b>	<b>Tank Minimum Size (gal)</b>
1	300	5000
2	200	2500
3	200	1000

Source: National Wildfire Coordinating Group (NCWG) *Fireline Handbook*



The background of the slide is a dark blue surface with a diamond plate texture. Numerous water droplets of various sizes are scattered across the surface, some in sharp focus and others blurred, creating a sense of depth and texture.

As you can see from Figure 3, there is no specification for tank off-loading performance. If these tenders are to be used for structure firefighting, with only the pumps they carry available, they cannot deliver the 500 - 1000 gpm required for fighting structure fires or dealing with HazMat incidents.



# Mobile Water Supply Apparatus

Another term used to define tank vehicles, mobile water-supply apparatus, comes from the NFPA. (As is often the case with committees developing NFPA standards, they've chosen a politically correct term for tankers and tenders.) NFPA 1901 requires the *tank of a mobile water supply apparatus have a capacity of at least 1000 gallons.*

**Paragraph 3.3.109 of NFPA 1901 states:** *Mobile Water Supply Apparatus (Tanker, Tender). A vehicle designed primarily for transporting (pickup, transporting and delivering) water to fire emergency scenes to be applied by other vehicles or pumping equipment.*

In addition, paragraph 19.5 of NFPA 1901 requires that a mobile water supply apparatus be equipped with single or multiple tank connections to allow water to be transferred from the tank to an external use to the right, left, and rear of the apparatus at an average rate of 1,000 gpm, with the apparatus on level ground.



# Defining Terms

Before I go any further in discussing WOW operations, I must establish some basic terms I use to describe the types of tank vehicles used. Unlike the terms mentioned previously, the terms I'll use are based on the intended functions of the tank vehicles. The six basic types of vehicles used in water transport operations are:

- Pumper
- Pumper/tanker
- Tanker/pumper
- Tanker with a pump
- Tanker
- Auxiliary tank vehicle



# Pumper

The primary function of a pumper is fire attack, not water transport.

*A pumper is defined by NFPA 1901 as an apparatus equipped with at least a 750-gpm pump, a 500-gallon water tank and a full complement of hose, ladders and other equipment required for performing both fire attack and water-supply operations.*

Although we don't normally think a pumper will be effective during a WOW operation, it can be very helpful (even with only a 500-gallon tank) when firefighters are in desperate need of water. Many rural and suburban departments equip their pumpers with 750- or 1000-gallon tanks, which are even more beneficial to WOW operations.

Pumpers have no way of off-loading other than by pumping it off via a pump discharge(s). This means that the off-loading rate of a pumper depends on 1) the capacity of the pump and 2) the capability of the tank-to-pump line(s) to supply the pump with water.



# Pumper



**Figure 4.** A pumper can be used for water transport even though its primary function is fire attack.



# Pumper/Tanker

A pumper/tanker is a tank vehicle that meets the criteria of a pumper, but it also has a tank that can carry at least 1000 gallons of water. The primary function of a pumper/tanker is fire attack. The secondary function of a pumper/tanker is water transport. Ideally, a pumper/tanker should be able to both off-load and fill the water tank at a rate of 1000 gpm.



# A Pumper/Tanker



**Figure 5.** A pumper/tanker has a tank that can carry at least 1000 gallons and is equipped with dump valves. It's primary function is fire attack. Water transport is second.



# Tanker/Pumper

A tanker/pumper is a tank vehicle that can carry a minimum of 1000 gallons and is equipped with a pump that can offload a minimum of 750 gpm, but may or may not carry all the equipment required for pumper by NFPA 1901. The primary function of a tanker/pumper is to haul water. The secondary function is to perform fire attack operations and water-supply operations. Ideally, a tanker/pumper should be able to both off-load and fill its water tank at a rate of at least 1000 gpm.



# A Tanker/Pumper



**Figure 6.** A tanker/pumper may or may not carry all the equipment required for pumpers by NFPA 1901. It's primary function is water transport. Fire attack is its secondary function.

# Tanker with A Pump

A tanker with a pump is a tank vehicle that can carry a minimum of 1000 gallons of water and is equipped with some type of pump—a fire pump of any capacity, a portable pump or other non-fire-service pump—supplied by the tank. The pump may be used to facilitate tank off-loading, tank filling or limited fire-attack operations. The primary and generally sole function of a tanker with a pump is water transport.



# A Tanker with A Pump



**Figure 7.** A Tanker with a pump has a primary purpose of water transport. The pump may provide limited fire attack capability.

*Rural Fire Command — December 2005 — by Larry Davis*



# Tanker

A tanker is a tank vehicle that serves a single purpose: to haul water in WOW operations. In some cases, a tanker may carry a portable pump, but it is generally not connected to the tank. In other cases, the tanker may be used to carry additional equipment, such as ladders, simply because of the room needed to carry such equipment.



# A Tanker



**Figure 8.** A tanker serves a single purpose — water transport.

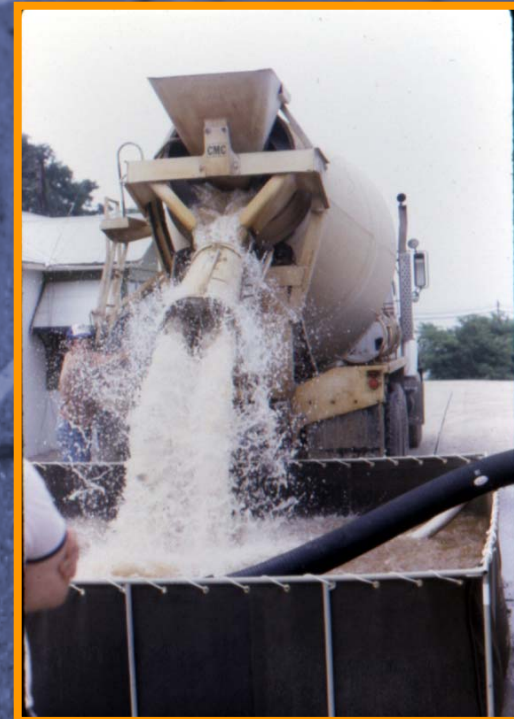


# Auxiliary Tank Vehicle

An auxiliary tank vehicle is any non-fire-service vehicle firefighters can use to haul water in WOW operations. Tank vehicles of this type are not routinely used in WOW operations, but they can be utilized in major emergencies to supplement water-transport operations.



# Auxiliary Tank Vehicles



**Figure 9.** Auxiliary tank vehicles of any type can be used in WOW operations.



# Public Works Tanker



**Figure 9A.** Most municipalities have some type of water hauling vehicle in the public works or street departments. These can be equipped with large dump valves for use as auxiliary vehicles during an emergency.



# Bladders



**Figure 9B.** Bladders such as these can be purchased in various sizes and can be hauled in about any type of vehicle. This one used by a farmer could provide extra water when needed in an emergency.



# Acid Tanker



**Figure 9C.** This tanker's normal life is to haul acidic water from coal mines. In the evenings and on weekends and holidays, after these trailers have been flushed out, they sit empty. Here one is used to supply water to a live-fire training exercise in a rural area. Notice that a hole had to be dug for the porta-tank.



# Cement Mixer



**Figure 9D.** A cement mixer can really haul and off-load water at a high rate. Here, the mixer off-loads its 2000 gallons in about 1 minute.

While maybe not practical for the average house fire, if and when a major haz-mat incident or a major fire occurs, it can be a tremendous asset.



# Conclusion

As you can see, while virtually any type of vehicle with a water tank can be used in a WOW operation, some designs out-perform others in hauling water. Departments need to design their WOW apparatus based on the function(s) they expect it to perform.

In future issues, I'll explore methods that rural departments have employed to maximize their WOW operations.

Until next month, stay safe.

**For Questions or comments on this or any of the Rural Fire Command articles, contact the author at [ldavis@RFI411.org](mailto:ldavis@RFI411.org)**



# About the Author



Larry Davis is a full member of the Society of Fire Protection Engineers, a Certified Fire Protection Specialist, and a Certified Fire Service Instructor II with more than 30 years experience as a fire service instructor. He is Vice President of GBW Associates, and Chairman of the Rural Firefighting Institute.

Davis has conducted more than 400 Rural Firefighting Tactics and Rural Water Supply Operations seminars throughout the United States and Canada. In addition, he has written numerous fire service texts, including *Rural Firefighting Operations*, books I, II, and III. Most recently, Davis co-wrote the *Rural Firefighting Handbook* and *Foam Firefighting Operations*, book I with Dominic Colletti.





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