FIRERESCUE

January 2005 • U.S. $4/CAN $5

***Rural Fire Command***

by

***Larry Davis***

# Installment 32 — July 2005

# Gaining Access

*Exploring and alternative to drafting*

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.

# Gaining Access
## Exploring an alternative to drafting

In the past several columns, I've discussed drafting operations at length. In many cases, however, fire department pumpers can't access or draft from static water sources. Historically, in those cases, the only alternative was to use one or more portable pumps, which firefighters had to carry to the source, set up to draft and pump through discharge lines to pumpers or fill tankers.

One relatively new device that can save rural firefighters time and energy when a water source is inaccessible by pumper: the TurboDraft.

***Historically, the only alternative [to pumpers] was to use one or more portable pumps.***


Figure 1. Here is the standard TurboDraft with 2-1/2” and 5” hoselines connected. The 2-1/2” or “motive” line supplies the water to operate the TurboDraft. The 5” line serves as the supply line from the TurboDraft to the pumper or other device. Depending on conditions explained in this article, a 200-gpm flow through the 2-1/2” line can cause the TurboDraft to pick up an additional 800 gpm and deliver it through the 5” hose to a pumper or other device.

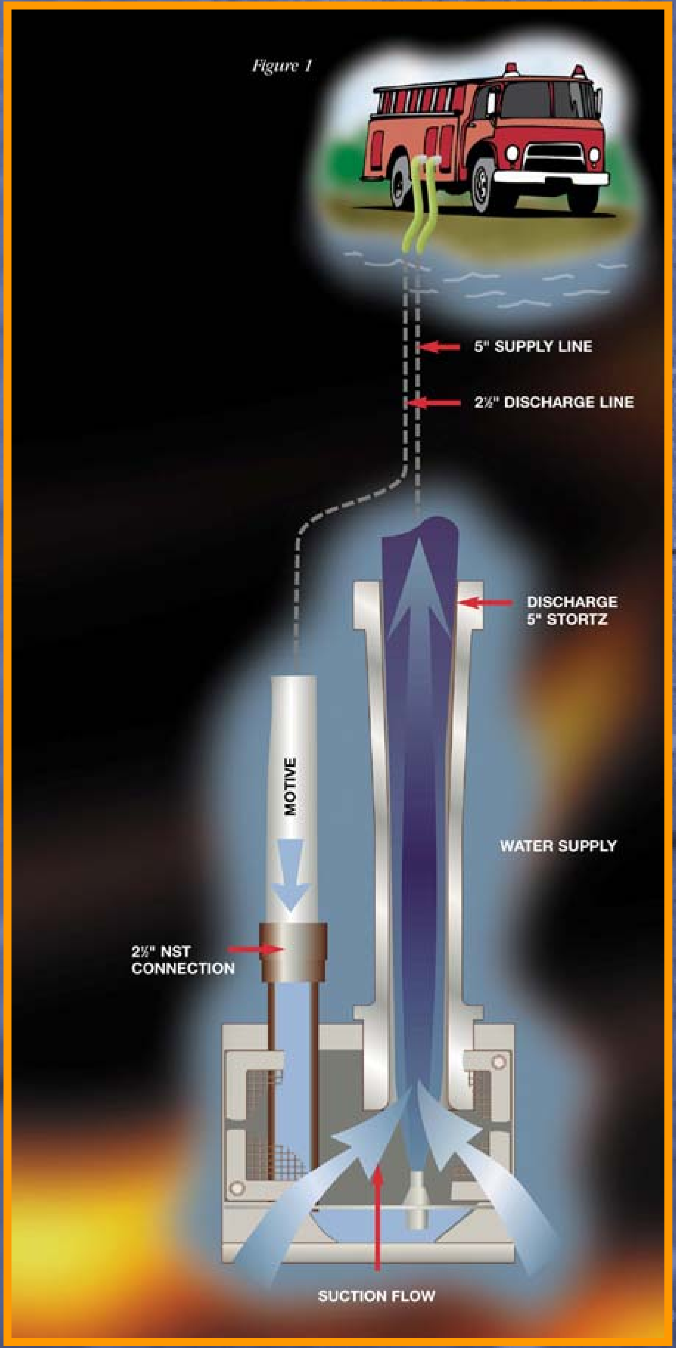


Figure 2. The design of the TurboDraft creates a venturi where the water from the 2-1/2” line exits the nozzle and enters the venturi tube. The venturi creates a negative suction that draws additional water in through the strainer for discharge into the 5” line.

# Some History

My first experience with the TurboDraft was in the mid-90s when I lived in Glastonbury, Connecticut. Stephen Haynes, then Fire Chief of the Glastonbury Fire Department, invited me to watch as he tested a prototype of a new rural water-supply device developed by Schutte and Koerting in Pennsylvania. Figures 3 and 4 show this test.

Figure 3. The original version of the TurboDraft was a modified marine eductor that Schutte and Koerting have manufactured for the Navy for shipboard firefighting for years. This test was conducted in Glastonbury, Connecticut.

Figure 4. In the Glastonbury test, a pumper used its booster tank to supply the "motive" line to the TurboDraft. The flow from the pumper equaled about 200 gpm. The 5" line from the TurboDraft to the pumper's intake supplied the pumper with about 800 gpm. Once the 5" line was charged, the pumper's deck gun was opened to flow the excess 600 gpm. This testing helped lead to the redesign shown in Figure 1.

# The Royersford Tests

Figures 5 and 6 show a perfoect application for the TurboDraft. Here, the Humane Fire Company of Royersford, Pennsylvania, utilizes a TurboDraft to access the Schuykill River at a point not accessible for drafting. The lift in this case equaled 10 feet and the distance between the TurboDraft and the pumper equaled 150 feet. The portable monitor shown in Figure 6 dischrges the excess flow delivered by the TurboDraft.

The TurboDraft is a great tool for accessing water sources that a pumper can't reach. And at only 52 lbs, it delivers a high flow rate compared to that of a much heavier portable pump.

Figure 5. The TurboDraft is placed into the Schuylkill River.


Figure 6. The Humane Fire Company’s pumper supplies the TurboDraft through a 2-1/2” line, which in turn supplies the pumper with about 800 gpm through the 150-ft 5” line. The pumper than used the access water to supply the portable monitor with more than 500 gpm.

***Various forms of water eductors have been around for a long time, but nobody ever developed one that could deliver flows as high as those possible with the TurboDraft.***

# Theoretical TurboDraft Usable Flows

| Length of 5" Hose | Lift (ft) | Pump Discharge Pressure | Max. Usable Flow (gpm) |
|---|---|---|---|
| 50 ft | 10 | 175 psi | 670 |
| | 20 | 175 psi | 470 |
| 100 ft | 10 | 180 psi | 570 |
| | 20 | 180 psi | 400 |
| 150 ft | 10 | 185 psi | 480 |
| | 20 | 185 psi | 325 |
| 200 ft | 10 | 190 psi | 440 |
| | 20 | 190 psi | 280 |

COURTESY SCHUTTE AND KOERTING

Figure 7. This table shows the maximum theoretical usable flows available with various lifts and hoselay lengths. As you can see, the length of 5” discharge hose and the lift impact the flow and require higher discharge pressures.

# Applications

Firefighters can utilize the TurboDraft in a variety of ways,such as the common situation shown in Figure 4 in which a pumper supplies its tank water to power the unit so it can deliver flow to the pumper's intake through 5" hose. The pumper then discharges the excess water to whichever fire-attack devices, relay pumpers, or tanker fills as needed.

The pump operator monitors the incoming 5" supply line and maintains sufficient flow to recirculate to the TurboDraft to keep it operating properly. You can do this by pulling the incoming pressure down to the point where the 5" line becomes spongy, and then reducing the discharge a bit.

Figures 8-17, courtesy of Shutte and Koerting, show actual field applications.

Figure 8. This is a perfect application of the TurboDraft. With lines preconnected, one person can easily deploy it.

Figure 9. Fire departments in Bucks County, Pennsylvania, operate at a dump truck vs. gasoline tanker accident that spilled gasoline and required foam standby lines.

# Whirlpool Stoppers

One problem we may encounter when drafting from shallow water with a barrel strainer is the whirlpool that can develop, which allows air to enter the suction line and causes the pump to lose its prime and the boss to have a bad day. Such was the case in Pictou Landing, Nova Scotia, during a rural water supply class, but special tools I call “whirlpool stoppers” (for lack of a proper name) can save the day.

Figure 10. Due to a limited tanker shuttle area, firefighters dropped a TurboDraft into the Delaware Canal. The pumper in the foreground operated the TurboDraft and supplied the pumper in the background with water for foam standby lines.

Figure 11. In this case, a mini-pumper with a 300-gpm at 150-psi fire pump drafts from a water source to supply the TurboDraft. But instead of the 5” discharge feeding the mini, the 5” line supplied a pumper on the main road.


Figure 12. The mini and the TurboDraft supplied this pumper with 870 gpm.

# Figures 11 and 12

You could achieve the same set-up shown in Figures 11 and 12 by using one or two portable pumps with the proper capacities.

Another application would involve using a mini-pumper with a 500-gpm pump to supply two TurboDrafts in the same manner. This would allow the 500-gpm mini-pumper to deliver close to 2000 gpm.


Figure 13. The pumper in the foreground operates a TurboDraft to a water source 100 feet to the left of the pumper, and it uses the excess water tofill tankers at a water shuttle fire site.


Figure 14. The Fenton Township Fire Department operates a TurboDraft from a lake on which numerous condos have been built. The blue float holds the TurboDraft off the bottom, but are about two feet below the surface of the water.

The pumper, which has set up the TurboDraft. Is preparing to discharge through its deck gun.

Figure 15. The TurboDraft supplies the pumper with more than 500 gpm.


Figure 16. This department using a single engine to supply two TurboDrafts (into a stream), which are supplying the pumper with a net flow of 932 gpm.

Figure 17. Here are two TurboDrafts equipped with floats to hold them off the bottom of the stream.

# Conclusion

Various forms of water eductors have been around for a long time, but nobody ever developed one that could deliver flows as high as those possible with the TurboDraft.

For more information on the TurboDraft, visit www.TurboDraft.net or email TurboDraft@s-k.com.

**For Questions or comments on this or any of the Rural Fire Command articles, contact the author at 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.

RFI
RURAL FIREFIGHTING INSTITUTE

*Training America's Rural Fire & Emergency Responders*

**To obtain any or all of the other issues of the Rural Fire Command column, contact RFI at:**


**Info@RFI411.org**
**or**
**RFI**
**13017 Wisteria Drive, #309**
**Germantown, MD 20874-2607**
**Phone: 800.251.4188**


**Visit the RFI website at www.rfi411.org to learn of the other training resources and services available from RFI.**