



Maximizing Pumper Flow at Draft

Lempster, New Hampshire
April 15, 2012

Overview

- On April 14th and 15th, 2012, GBW Associates, LLC conducted a Rural Water Supply Operations Seminar hosted by the Cold River Area Fire Chief's Association in Lempster, New Hampshire.
- Part of the seminar included a review of drafting operations – including the use of multiple suction intakes to increase pump capacity.
- The folks from Newport Fire & EMS had a 1,500 gpm pumper that folks were interested in seeing how much water could be pumped if all three suction inlets were used.
- So...a flow test was arranged at a local pond.

The Process

- The flow test was quite simple – Newport Fire and EMS's 1,500 gpm pumper (88 Engine 2) set up to draft using three different scenarios.
- The pumper drafted using a single, side suction intake; both, side suction intakes; and then both sides intakes and the front suction intake.
- The discharge output was measured by, 1) using a Hose-Monster fixed pitot diffuser device supplied by the pumper's high-flow discharge via 50-ft of 4-inch LDH, and 2) a hand held pitot reading of the pumper's deck gun which was equipped with a 2-inch smooth bore tip.
- In order to control test variables, each test had the flow measurement taken when the pumper's tachometer reached 1500 rpm.

Test Pumper



Newport Fire & EMS's 88 Engine 2 – a 2002 Ferrara engine/tanker with a Hale 1,500 gpm single-stage QMax pump and a 4-inch high-flow discharge.

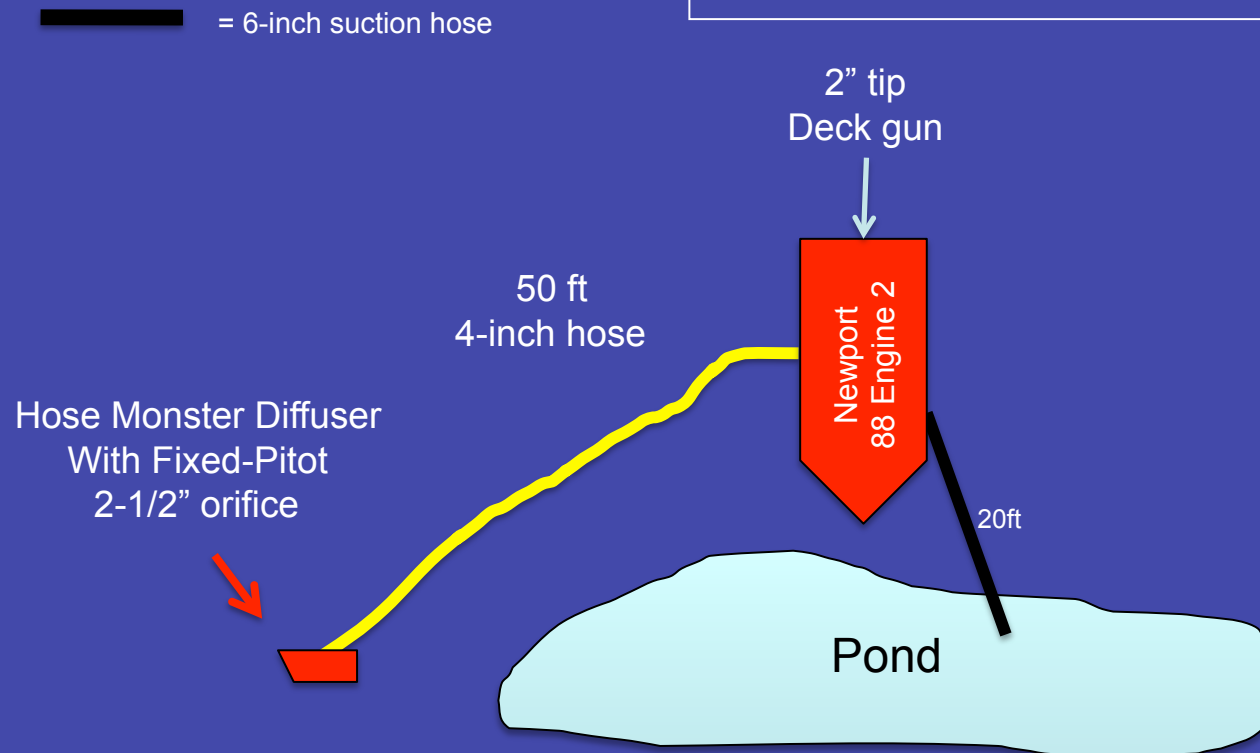
Flow Test #1 – Set-Up



20-feet of 6-inch hard suction hose connected to the driver side 6-inch suction intake. Suction strainer was a Kochek floating strainer. Hose Monster flow diffuser is seen in foreground..

Flow Test #1: The Results

Deck Gun 15 psi Flow = 460 gpm
Hose Monster 16 psi Flow = 675 gpm
Total Flow = 1135 gpm



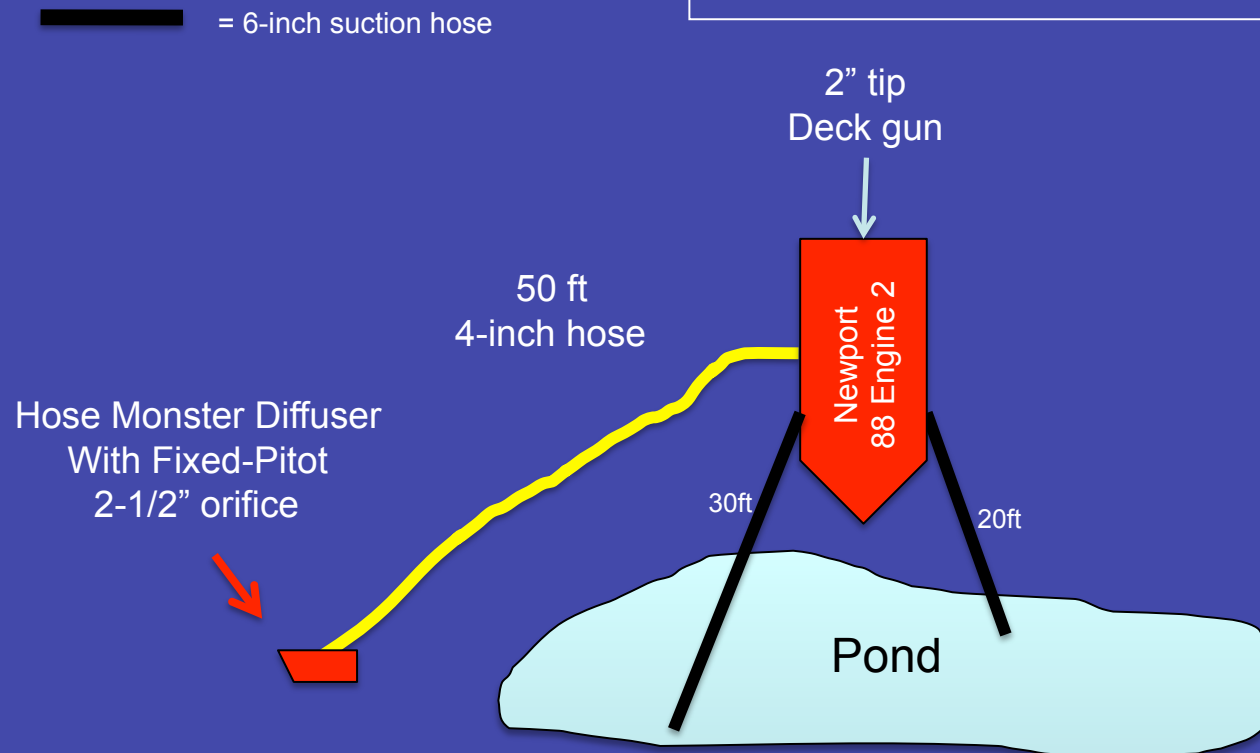
Flow Test #2 – Set-Up



No change to driver side suction set-up. Added 30-ft of 6-inch hard suction hose on officer side 6-inch suction intake. A 6-inch box strainer was used.

Flow Test #2: The Results

Deck Gun 52 psi Flow = 857 gpm
Hose Monster 60 psi Flow = 1306 gpm
Total Flow = 2163 gpm



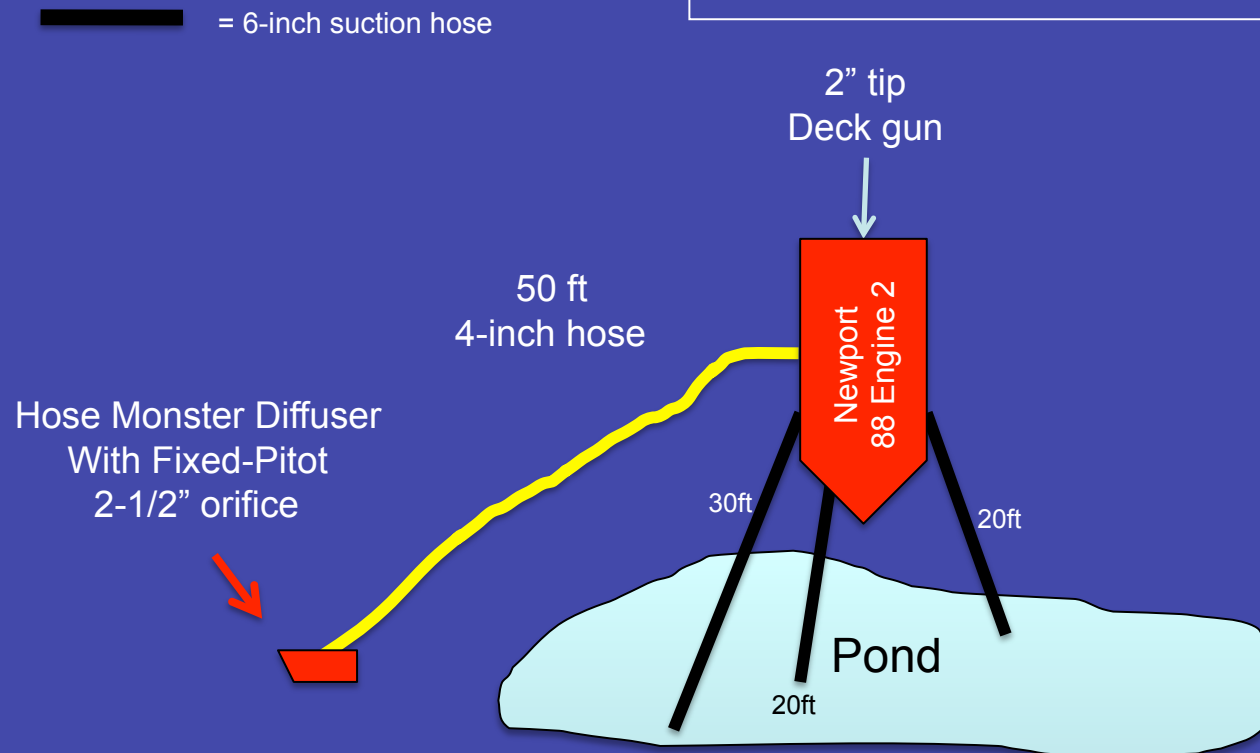
Flow Test #3 – Set-Up



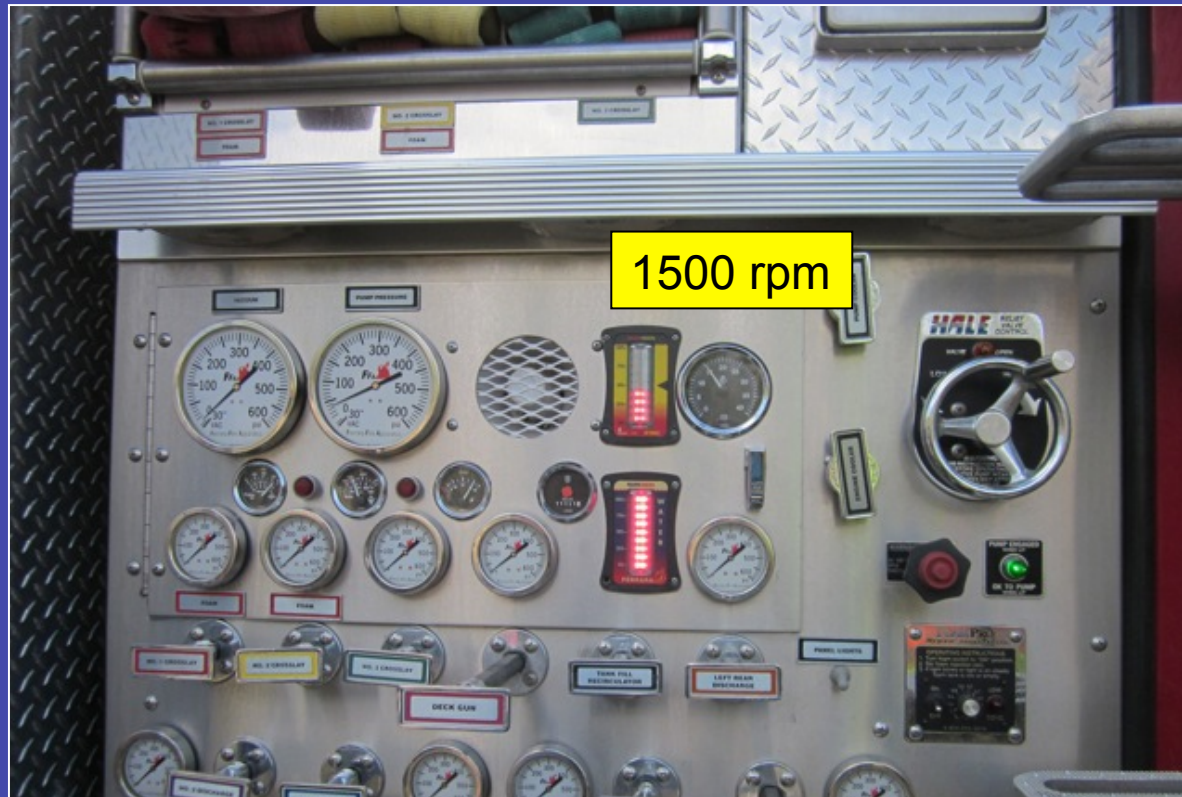
No change to the driver side and officer side set-up. Twenty feet of 6-inch hard suction hose was added to the 6-inch front intake. A 6-inch box strainer was used.

Flow Test #2: The Set-Up

Deck Gun 60 psi Flow = 920 gpm
Hose Monster 69 psi Flow = 1401 gpm
Total Flow = 2321 gpm



Engine Speed



For each test, the throttle was increased until a reading of 1500 rpm was achieved on the tachometer. At that point, flow measurements were recorded.

Summary

- These flow tests clearly illustrate that a pumper CAN pump more than its rated capacity.
- The simple use of the second, side suction intake increased the flow by 91% on this pumper at this drafting scenario - that is HUGE and could really make a big difference in a large, water supply operation.
- The results of these flow tests reinforce the need for rural pumpers to carry more than 20-feet of hard suction hose.
- Remember, to maximize pump capacity at draft, get the pump as close to the water as possible to minimize lift and use multiple suction intakes.



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