Discharge Flow Tests
Bonneauville Engine/Tanker 19

Adams County, Pennsylvania
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Overview

- On June 5th and 6th 2010, GBW Associates, LLC conducted a Rural Water Supply Operations Seminar hosted by the Adams County (Pennsylvania) Volunteer Emergency Services Association.
- Part of the seminar included a review of drafting operations and the issues that effect a pumper's ability to discharge water.
- One department in attendance wanted to know the flow capability of their pumper's side discharges – so the stage was set to conduct a couple of flow tests.

The Test Pumper

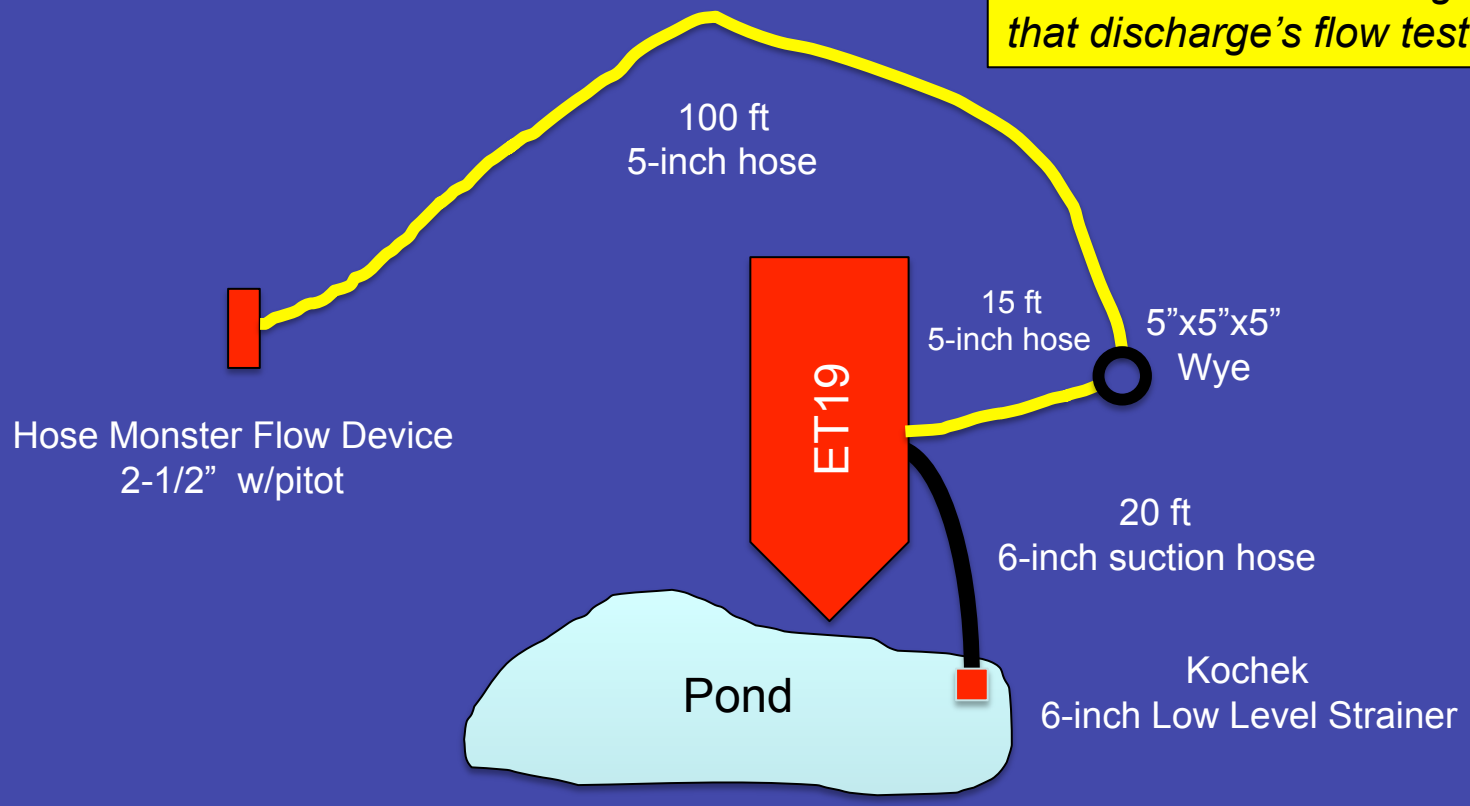
The test pumper was Bonneauville Engine/Tanker 19 – a 2003 E-One pumper with a Hale Qmax 1750 gpm single stage pump. The pumper has four, side discharges, two on each side of the rig.

The Process

- Four flow tests were conducted – one for each of the four side discharges. Each test used the same hose layout and the same flow test measuring equipment.

Flow Tests: The Set-Up

Note: The hose layout was moved to each discharge for that discharge's flow test.



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Flow Tests : The Set-Up

The engine/tanker drafted through 20-feet of 6-inch suction hose and the lift was less than 4-feet. Note: the uncharged section of LDH shown in the photo on the left was never used for any of the four flow tests.

Discharge #1 : The Results

- Hose Monster Reading = 55 psi or 1,251 gpm
- Pump panel discharge gauge = 110 psi
- Motor rpms = 1350

Photo not from the testing process

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Discharge #2 : The Results

- Hose Monster Reading = 52 psi or 1,216 gpm
- Pump panel discharge gauge = 140 psi
- Motor rpms = 1305

Photo not from the testing process

Discharge #3 : The Results

- Hose Monster Reading = 57 psi or 1,273 gpm
- Pump panel discharge gauge = 110 psi
- Motor rpms = 1540

Discharge #3

LDH Discharge : The Results

- Hose Monster Reading = 56 psi or 1,262 gpm
- Pump panel discharge gauge = 90 psi
- Motor rpms = 1495

Photo not from the testing process

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Comparing The Results

	Pitot (psi)	Flow (gpm)	Pump (psi)	Motor (rpm)
Discharge #1	55 psi	1251 gpm	110 psi	1350 rpm
Discharge #2	52 psi	1216 gpm	140 psi	1305 rpm
Discharge #3	57 psi	1273 gpm	110 psi	1540 rpm
LDH Discharge	56 psi	1262 gpm	90 psi	1495 rpm

- The flows (gpm) were fairly consistent between the four discharges.
- The LDH discharge did not need as high a discharge pressure but the motor still worked just as hard.
- Each discharge was clearly different in terms of motor work needed for the flow produced.
- Because all four tests produced similar flows – including the LDH discharge, we suspect the suction layout to have been maximized – most likely at the strainer. We believe that the LDH discharge could have flowed more water with a barrel strainer or by using dual suctions.

Summary

- It is important for every FD to know the capabilities of their pumpers.
- In the case of the Bonneauville unit, it is clear that the 1750 gpm pump was quite capable of supplying 1000+ gpm through its side discharges – but that would not have been known had it not been tested.
- It is also pretty clear that all four tests were probably limited by the use of the low level strainer – in that the tests approached the maximum performance level of that particular strainer in the conditions that it was used.

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