

The Rural Hitch

Using the

Humat Valve



December 10, 2021

The Rural Hitch

A best practice in rural water supply operations is to have the first in engine drop a supply line at the entrance to the incident. This allows the tankers/tenders to remain on the highway and produces less congestion at the incident scene. Even when a nurse tanker operation is anticipated, this practice is encouraged in case the incident expands to where a water shuttle operation is needed.

One question faced by many fire companies is what appliance to attach to the end of the supply line. Typically, a siamese is the logical choice as it provides the opportunity to seamlessly switch from one tanker/tender to the next with no interruption when the first in tanker is empty. In addition, if the operation expands to the use of a supply engine drafting from a folding tank or tanks, the transition from the tanker/tender to the supply engine can be made seamlessly as well.



For fire companies operating with 3 inch supply lines a standard 2 ½ inch clapper valve siamese is adequate. For fire companies that operate with LDH, a large clapper valve siamese provides an optimum solution without restricting the available flow to the attack engine.



The dilemma faced by fire companies that operate in areas with a mix of rural and hydrants is which device is the best to carry preconnected to the supply line. One solution would be to split the supply line into two loads and have a hydrant valve hitch on one side and a siamese on the other side.



For fire companies that do not operate with split supply line hose beds, the frequency of operations may dictate which device to carry. If the first due is mostly rural, then a siamese would be the appropriate choice. If the area is predominately hydrants, then a hydrant valve would be the appropriate choice.

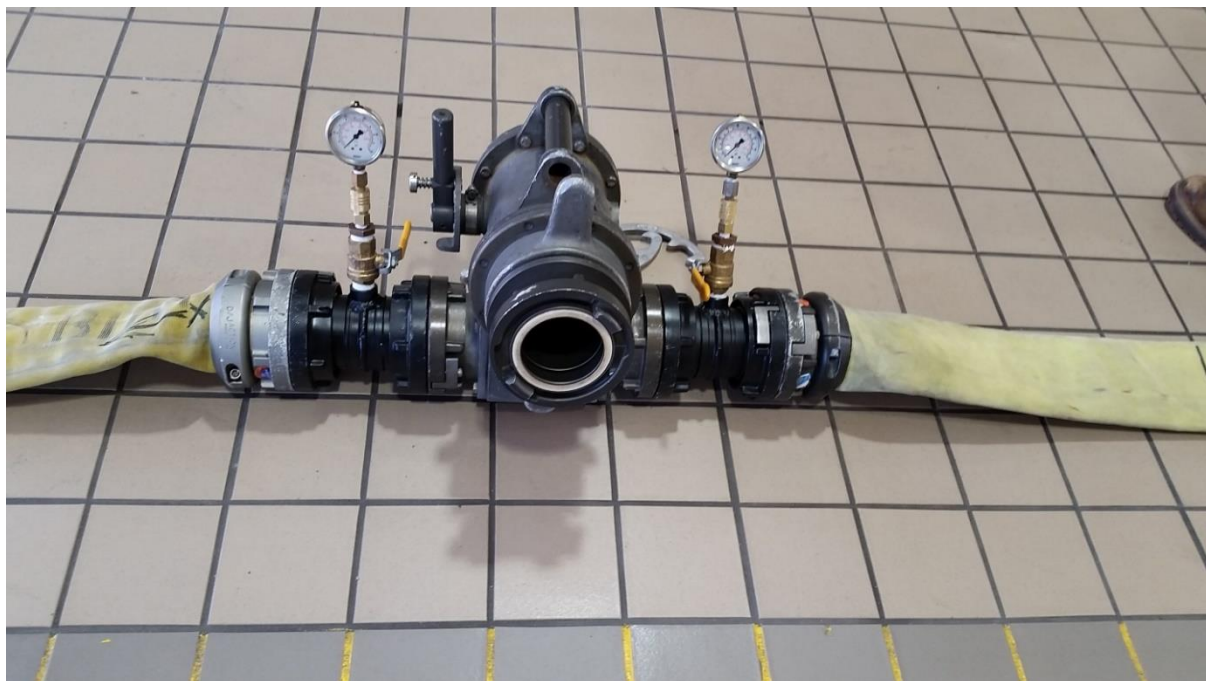
For fire companies that have an equal number of working fires in rural and hydrant areas, the Humat hydrant valve is a possible choice.

In order to evaluate the pros and cons of the Humat valve, the Bay District VFD evaluated the flow characteristics of the Humat when operated as a rural hitch appliance.

Test Method

When the Humat is operated as a rural siamese appliance, like all siamese appliances, there are two intakes. One unique feature of the Humat is the two waterways through the device are distinctly different. One is straight through a 3 ½" box shaped structure and the other passes through the 4 ½" hydrant intake with an internal 3" clapper valve. Due to the different waterways, the friction loss is different depending on which waterway is used. In the test set up, the Humat was tested flowing a nominal 500, 750 and 1000 GPM through each of the waterways.

Pressure gauges were attached to the intake side and the discharge side of the Humat. The difference in the pressure readings was a measure of the friction loss through the device at the different flows.



The discharge flows were measured using a portable deck pipe and a pitot gauge. Unlike the friction loss gauges, a pitot gauge of known accuracy was necessary to produce an accurate measurement of the flow. A 2" tip on the deck gun was used.



The supply engine was set up on a hydrant using the front intake and a 50 foot section of 3" into the side intake. The engine supplied the portable deck pipe through 50 feet of 4" LDH.



Test Results

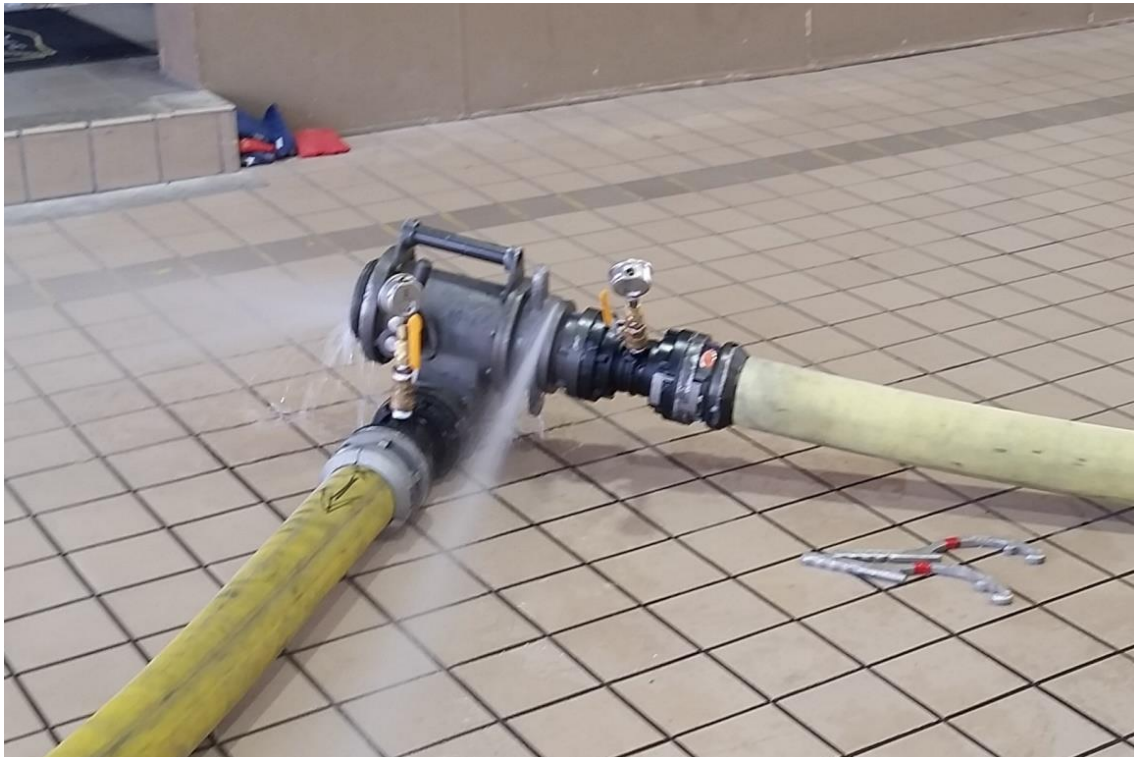
The flow through the two different waterways of the Humat produced the following friction loss results.

Flow Through Humat Straight Box Waterway

Hydrant Pressure	Engine Intake	Engine Discharge	Humat In	Humat Out	Friction Loss	Tip Size	Tip Pressure	GPM
34	34	N/A	32	28	4	2	18	504
32	32	N/A	84	78	6	2	54	873
29	20	N/A	158	145	13	2	95	1158

Flow Through 4 ½" of Humat w/3" Clapper Valve Waterway

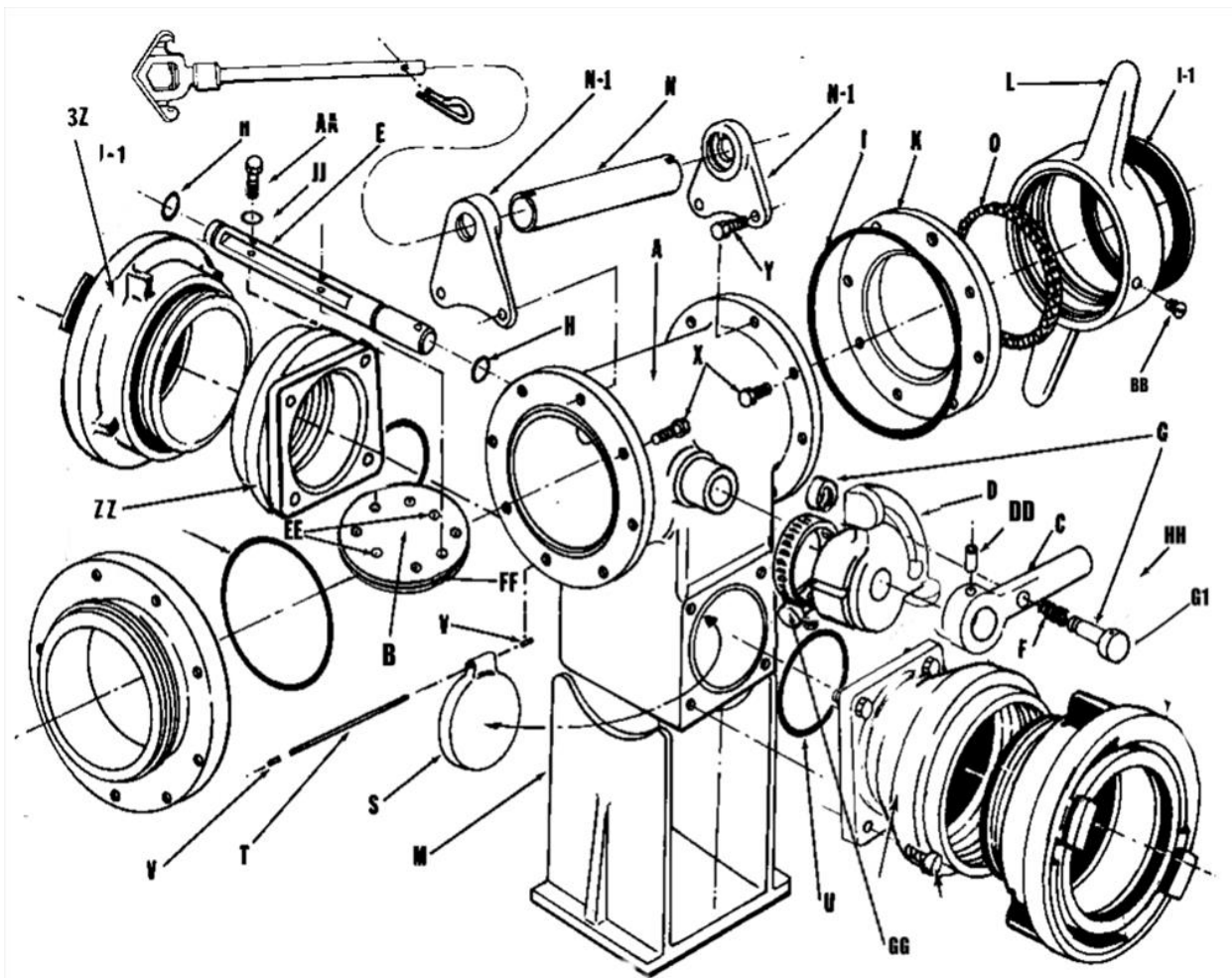
Hydrant Pressure	Engine Intake	Engine Discharge	Humat In	Humat Out	Friction Loss	Tip Size	Tip Pressure	GPM
39	39	N/A	48	34	14	2	24	582
30	30	100	95	56	39	2	50	840
29	20	190	180	135	45	2	95	1158



Lessons Learned

- As expected flow through the 3" clapper produced considerably more friction loss.
- Supply engine operators should strive to place their discharge line on the Humat 'box' intake.
- If the supply engine utilizes the Humat's 4 ½" female intake which flows through the 3" clapper valve waterway, the pump operator should add an additional 40 PSI to the discharge pressure when attempting to flow more than 750 GPM.
- The clapper valve waterway introduces the equivalent loss of 225 feet of 4" LDH when flowing 1100+ GPM.

Exploded View of Humat



Appreciation

Thanks to Bay District VFD Water Supply Officer Keith Fairfax and Technician Steve Wurtz who provided significant support and assistance in this effort. Also thanks to the Bay District Station 9 duty crew who provided support in setting up and operating the engine.