Rectangular Dump Tanks and the Single Lane Water Supply Setup

By: Charles Clark
Colerain Township F. D. Ross County, Ohio

It can be a logistical nightmare trucking water to a rural fire. We often have fires back long lanes which are served by narrow roads.

Bridges on private lanes and roads can be dangerous

Inspect private bridges regularly.

Even smaller trucks may not be able to lay a supply line to a fire.

It is important to keep heavy water supply vehicles out on the hard surfaced roadway to prevent a traffic jam back the lane.

Avoiding tanker grid lock back the lane

If you have a water supply preplan you will know when you need to drop a rural hitch and lay a supply line back the lane.

A rural hitch is either a manifold or a siamese clapper valve which makes it possible for multiple lines to feed into the water supply line laid back the lane.

Preconnected Rural Hitch

A manifold preconnected to LDH and mounted on the rear tailboard of a pumper provides for quick access for deployment.

It can be used to:

-hook up to a hydrant;

-lay back a lane; manifold can receive water from a nurse tanker and 2 lines from water supply pumper.

-lay back a lane to a pond; pump out to road; manifold distributes to tankers.

-lay from fire to water source; can distribute water to attack hose lines;

Caution: The siamese clapper valve can restrict flow. Which ever line comes in at the most pressure it will close off the other line. The siamese clapper valve is designed to flow water in just one direction. However, it does allow for a seamless transition from one pump off tanker to another.

Local roads can be very narrow.

On the typical rural road –especially one which has snow plowed off to each side the pavement width can be 16 ft. or less.

Below: Each tanker is 8ft. 6 in. wide. Each truck has a tire off the pavement to pass the other truck.

In some cases the road pavement width can get right down to one way traffic only!

Below: pavement width is 11 ft. 5 in.

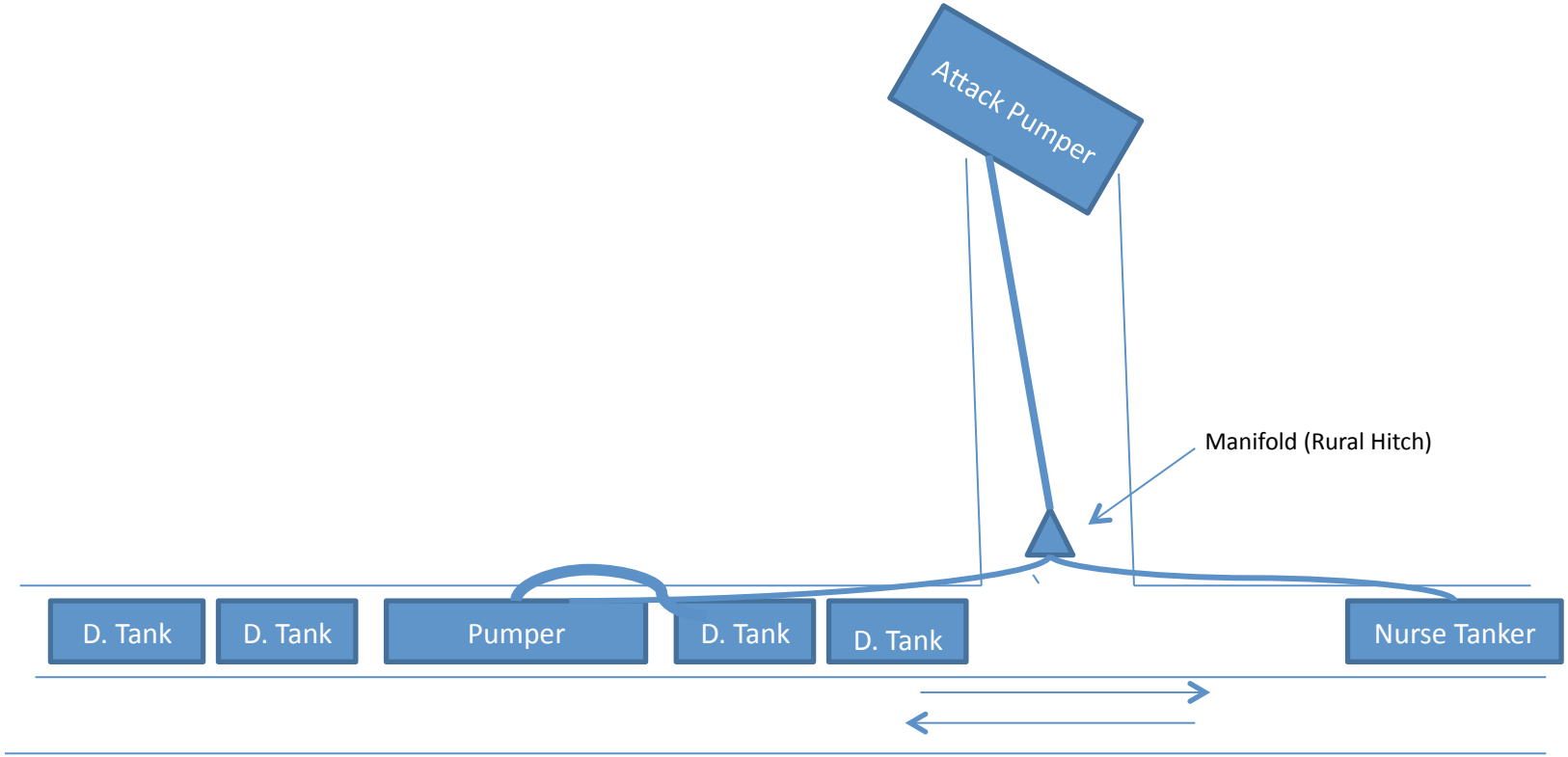
Most local roads have little or no berm.
When you get off the pavement you are immediately going down a steep bank into the ditch.

What can happen to a fire truck when it gets a few inches off the pavement?

What can happen to a dump tank when it extends beyond the pavement?

How do you set up for water supply on a narrow rural road?

The single lane water supply set up



Rectangular dump tanks make it possible to keep the water supply set up in a single traffic lane. There can be floating pumps in the two rear dump tanks to push water to the drafting tank. There is only one section of jet siphon tube needed for this set up. Only one pumper needed at the dump site. Rear dump tankers can dump when coming from either direction without needing to turn around. **Water supply set up can be simple and standardized!** Can you think of other variations to this set up?

Two rectangular dump tanks in front of pumper and two rectangular dump tanks behind pumper -all in a single traffic lane! The introduction of light weight flexible suction hose sure changed where you can set the dump tank for drafting.

Can the single lane concept also be used at fill sites with water free flowing into dump tanks from hydrants?

The single lane water supply set up allows for rear dumping tankers to dump when coming from either direction without needing to turn around. Most of the time tankers need to go in both directions to get water.

The single lane water supply set up keeps one traffic lane open

You can't pick where you need to set up for water supply. You have to be prepared to operate effectively on narrow roads. You need a set up that is flexible & adaptable. **What happens if you set a dump tank next to the pumper?** Staging of trucks and water supply set up must be on the fire side of the road. Can be automatic -no need for radio traffic about staging instructions.

You can special order dump tanks any dimension that fits your needs.

Since 1994 Colerain Twp. FD. in Ross County Ohio has used 8 ft. wide dump tanks to fit in a single traffic lane.

Below: 2001 I.S.O. certification drill

The 8 ft. wide dump tanks do not set out past the pumper and most importantly do not hang down into the ditch. Side dumps on tankers are a tremendous improvement in water delivery!

Rectangular dump tanks on a 16 ft. roadway

8 ft. wide rectangular dump tank

10 ft. wide rectangular dump tank

Colerain FDs 8 ft. wide dump tanks are 14 ft. long. They hold 2,000 gallons of water.
A more desirable size may be 3,000 gal. <u>but</u> if that 13 ft. X 13 ft. square tank hangs down in the ditch it may only hold 1/2 its capacity or **1,500 gallons of water!** Notice the water level in these tanks shows the crown or drainage slope in the road pavement. Notice the stream of water from the tanker dump valve. Should they stop dumping and move on to fill site?

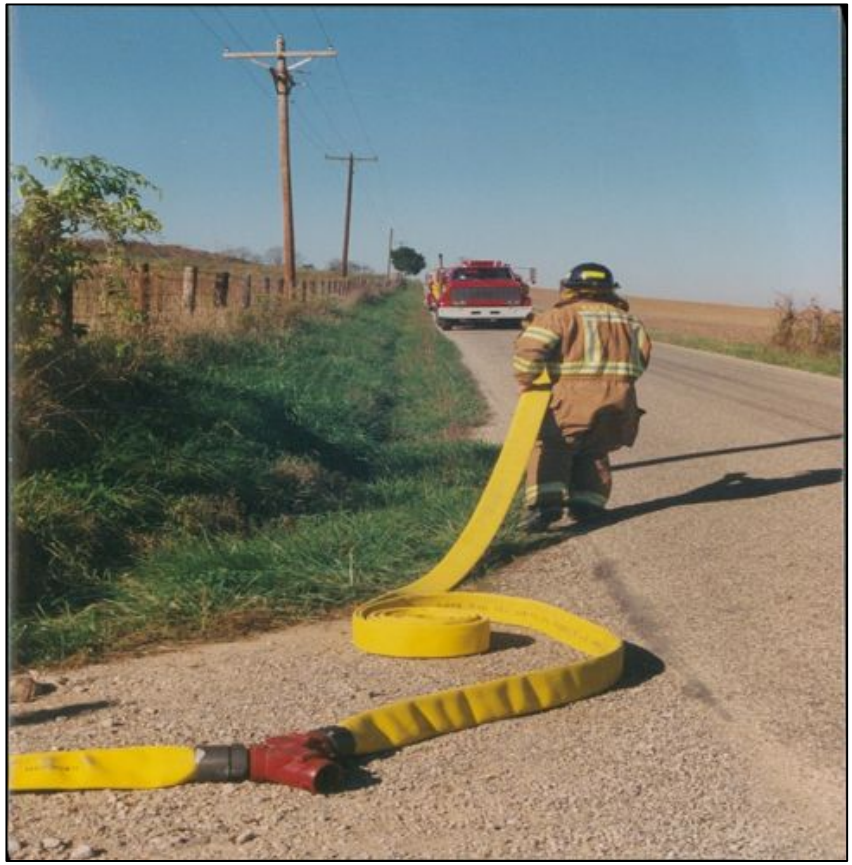
10 ft. X 16 ft. (3,000 gal.) rectangular dump tanks on 18 ft. wide pavement

Besides the two 8 ft. X 14 ft. (2,000 gal.) dump tanks Colerain FD also carries two 10 ft. X 16 ft. dump tanks (3,000 gal.) 80% of the roadways in Colerain's protection area are not wide enough for the 10 ft. tanks. After using both widths Colerain will probably go to only the 8 ft. width in the future. Its nice to be able to dump a 3,000 tanker in one dump tank but with side dumps that really doesn't matter. Note: The last time these tanks were used they extended 1 ft. off the pavement – what a mess! If you get off the pavement you can expect major problems!

Single lane water supply layout

Pulling out a 50 ft. length of hose can help you spot where to set the pumper. Colerain FD preconnects 10 ft. to the manifold for 60 ft. This allows dump tanks to set at the edge of the lane. **You should do a dry set up to see how things fit together.**

Two lengths of hose (100 ft.) allows for rear dumping without blocking the lane entrance. Pump off or nurse tankers can feed into the rural hitch from the other side of the lane. Side dump tankers can easily "top off" all the dump tanks in one pass with no delay!



Pointers on rectangular dump tanks

- Unless you go taller (over 30 inches) a rectangular dump tank won't be any more expensive to purchase than a square dump tank of the same volume.
- You can put drain tubes where ever you wish. On Colerain's rectangular tanks there are two drain tubes (one at each long end). Rectangular tanks are easier to fold up –the folding side rail has less material to handle –also easier to drain water.
- Measure your dump tank rack. Will it need to be modified to hold a rectangular dump tank? Just like hauling ladders rectangular dump tanks are worth the adjustments.
- Colerain's 3,000 gal. tankers have water tanks that are 18 ft. long-just long enough to hold 16 ft. long dump tanks and the 14"X 14" dump valve at the end of the tank.
- Quite often lanes come out to the main road at the peak of a hill for visibility in both directions. **Besides narrow roads we have to deal with sloping terrain. Caution:** If you can see a slight grade in the road where you are setting up dump tanks it will be very significant when you hook two dump tanks together at the drainage tubes. A jet siphon will give you more of a stair step situation because water seeks its own level and the two dump tanks could be kept independent of each other. In some cases the road may be too steep in slope which makes dump tank use impractical.

Four tankers dumping all at the same time.

All four were dump tested in about 5 minutes with one yard stick.

Colerain FD has two pumpers: 1250 GPM & 1,000 GPM. **Question:** If the 1250 GPM pumper lays a supply line back a lane how can the 1,000 GPM pumper serve effectively as water supply/relay pumper using the single lane concept with four dump tanks?

Answer: If a floating pump is used in each rear dump tank only one jet siphon tube will be needed to push water from the front dump tank to the drafting tank. The 1,000 GPM water supply/relay pumper will still be able to pump about 900 GPM to the attack pumper.

Floating pumps transfer water from dump tank(s) behind pumper to drafting dump tank in front of the pumper

Note the hose line holder attached to the dump tank in front of the pumper. The floating pump is rated 400 GPM @ 15 lb. pressure. It can easily push 300 GPM to the drafting dump tank. This can save on the number of jet siphons needed to transfer water thus preserving pumping capacity on the pumper.

This pump saves trying to fit another pumper into this arrangement. The fewer pumpers needed for water supply the better your I.S.O. rating. At $2,500 this pump is 1% the price of a pumper. Rectangular dump tanks are longer: more room to dump tanker without disturbing the floating pump or suction strainer.

Dump tanks set in front of pumpers require longer lengths of suction hose if there's no front or rear suction on the truck

A four door crew cab mid ship pumper requires three 10 ft. sections of suction hose to draft from a dump tank set in front of the truck. It would also need three sections to draft from the back.

A two door single seat cab mid ship pumper requires two 10 ft. sections of suction hose to draft from a dump tank set in front of the truck. It would need three sections to draft from the back.

Rear Suction can really enhance the single lane water supply set up.

Maybe front mount pumps will make a well deserved come back!

Rear Suction (a $4,000 option) can be handy. Front suction is more expensive ($6,000) and is more likely to have greatly restricted flow. (See reports on gotbigwater.com) The above prices are for new trucks; retrofit is cost prohibitive (Flexible suction hose is cheapest option.)

Preconnected suction hose can greatly reduce set up time. Can two people set up a dump site within 5 minutes? What if no nurse tanker is needed during set up? What if your first tanker to dump could return full by the 20 minute point of the incident? (Thanks to Harrison Twp. FD, Ross Co. Ohio for demonstrating their rear suction)

Dump Site Safety

The water supply pumper in the pictures below is a standard mid ship pumper with side mount controls (right next to the drivers side door).

Which set up below provides for the most pump operator safety?

Take the time to set up a safe and efficient dump site.

Pumpers with top mount controls are nice when using the single lane water supply set up –no standing in a ditch or traffic lane!

Lower Left: Dump Valve Safety -Operating dump valve from cab is safer.

If your old dump tank is bent up and leaking this might be a good time to try a rectangular dump tank.
Once you use rectangular dump tanks you'll wonder how you ever delivered water to a narrow road without them.

For more information about rectangular dump tanks and the single lane concept

Contact:

- Charlie Clark
- 656 Spencer Rd.
- Kingston, Ohio 45644

PH: 740-655-2721

E-mail: cdclark@horizonview.net

OR: The dump tank manufacturers

Scenes From Actual I.S.O. Tanker Shuttle Drills:

1. Fall 1985 (FDs with small budgets can excel!)

   -using 6X6 military surplus tankers

2. Spring 2001

   -using the single lane water supply set up

Colerain Township FD

Ross County, Ohio

Colerain Twp. F.D. founded in 1983
Class “7” I.S.O. rating in 1985

(3rd FD in Ohio to get a reduced ISO rating with no hydrants –tanker shuttle from stream)

Total 1985 investment in trucks:……$17,000

1985 cost of hydrant system with 500 GPM flow : $2,800,000

Tax levy: $42/yr. Insurance savings: $100/yr. –what a bargain!

From 250 GPM jet dump and plywood panels to 10 inch square dump valve & modern dump tank.

-what a vast improvement from 1983 to 1985.

2001: rectangular dump tanks, side dumps, & vacuum tanker –more big steps.

Developing water movement skills is an ongoing process.

Delivering 500+ GPM in 1985

Our 500 GPM front mount attack pumper flowed over 600 GPM during the drill.

Our 750 GPM fill pumper flowed 1,000 GPM into tankers and no one got hurt! Back then “We didn’t know any better.”

2001 I.S.O. Inspection: Oh the paper work!

Where's your large exposures?
Where's your water sources?

Where's your hose clamp?
How about that heavy hose burst jacket?

Multiple Water Sources

Water Source #1: Pumper at Hydrant

Water free flowed into dump tank from hydrant.

Good rule of thumb: 3 tankers per fill site.

Water Source #2: Pumper at Dry Hydrant

Note: Since this pumper was used to fill tankers it did not count towards fire scene pumping capacity for I.S.O. rating!

Single Lane I.S.O. Drill Set Up

-Two dump tanks in front of pumper; one dump tank behind pumper;
100 ft. 4 inch hose ran along the roadway to a portable monitor.
-Water sources: hydrant to the north and dry hydrant to the south.

- Peak flow during drill was 1080 GPM.

High Volume; Low Pressure

100 ft. 4 inch supply line

2 inch tip used on monitor:

841 GPM = 50 lb. nozzle pressure

1063 GPM = 80 lb. nozzle pressure

Most of the drill required very low nozzle pressure.

Note the two jet siphons connecting the two front dump tanks. **The key is to keep the drafting tank full.** Water needs to be removed from the front dumping tank as quickly as possible with low pump pressure, so double jet siphons were needed. If all side dumping tankers this would not be much of an issue.

One dump tank behind pumper accommodated rear dumping tankers

- Floating pump pushes water past pumper to drafting dump tank
- 3 inch suction hose could help avoid low pressure hose kinking at tank sides

This power point presentation, **Rectangular Dump Tanks and the Single Lane Water Supply Set Up** was produced by Charles D. Clark of the Colerain Township Fire Department, Ross County, Ohio.