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### NF94-178 Nebraska Surge Irrigation Trials

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## Nebraska Surge Irrigation Trials

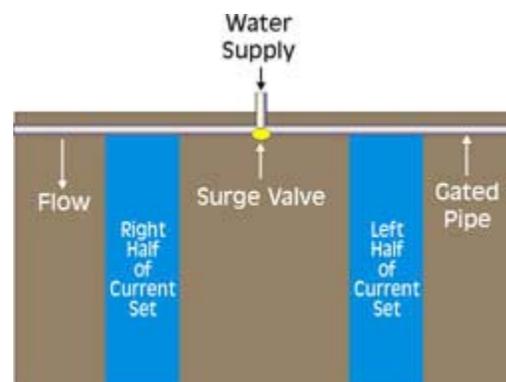
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Surge irrigation is a technique that enhances furrow irrigation effectiveness by intermittently applying water to each side of a programmable surge valve. The placement of the valve depends on conditions specific to the sight and the goals of the irrigator. In turn, different valve configurations will require different management considerations. A typical valve placement and system description is shown in Figure 1.

### Setting Up the System

Normally, a surge valve is installed in a gated pipe system and regulates water between open gates on either side of the valve. If gated pipe is already used and the water source is conveniently located, a surge valve may be the only additional equipment required.

Field layouts for surge irrigation systems are shown in Figure 2(a-g). An ideal situation is to have the irrigation well or water supply located near the middle of the gated pipeline (a). The valve could then be placed so there is equal land area or number of furrows on each side of the valve. Many times this is not possible and the water supply must be brought to the appropriate location using mainline pipe (b). Another method is to place the surge valve at the edge of the field and use two parallel lines conveying water down the field cross-slope (c). This is the desired layout if lay-flat plastic pipe is used to achieve constant downhill water flow. For cases (a), (b) and (c), water is alternated between open gates on either side of the surge valve. This requires that gates are opened on each side of the surge valve every time a new irrigation set is made.



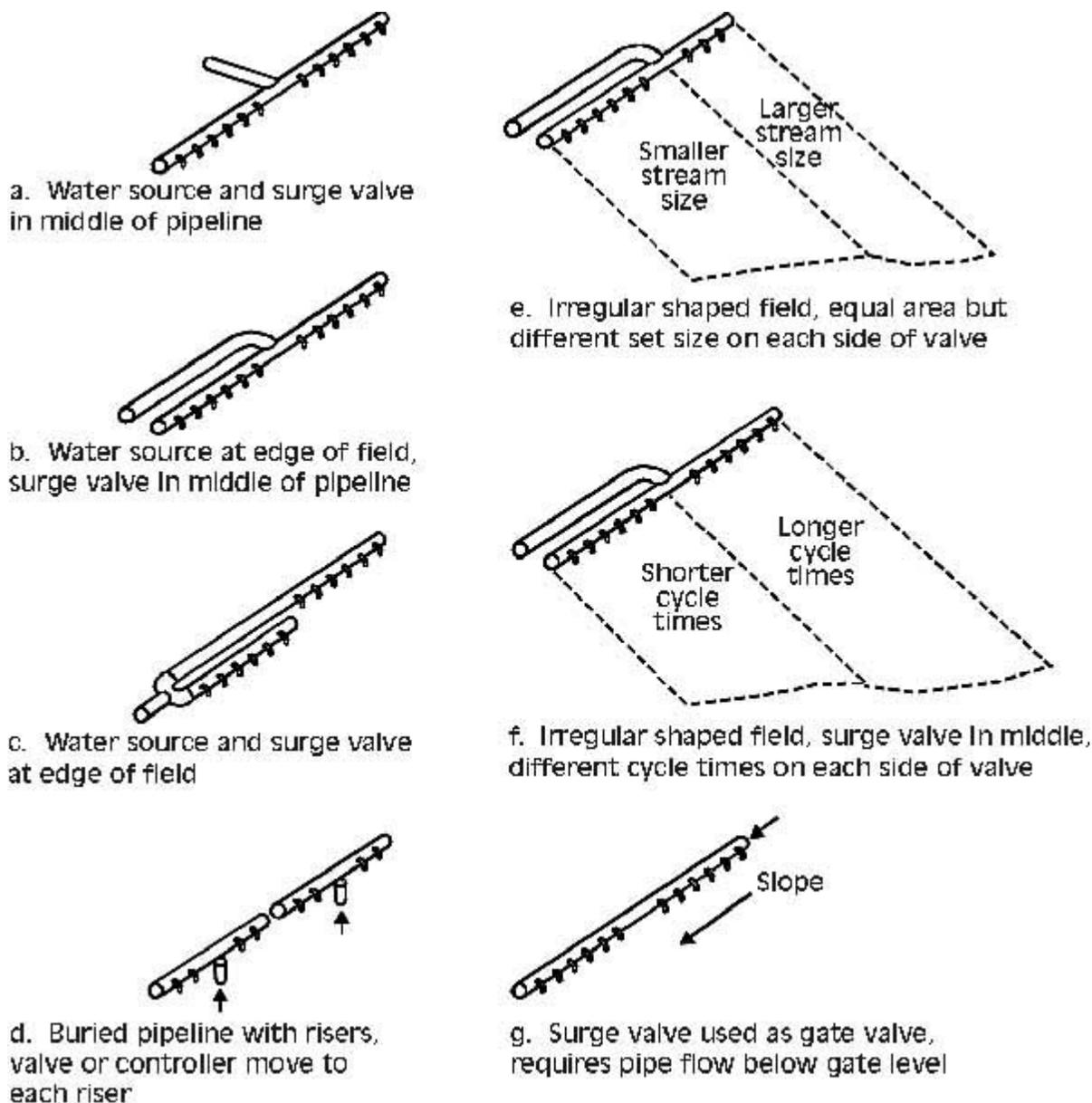
**Figure 1. A typical surge valve installation**

Another alternative is to use buried pipelines with risers spaced at intervals that will allow an irrigation

set at each riser (d). This system does not require opening and closing the gates once they are set, but it does require moving the surge controller to each of the risers, unless the more expensive option of placing a controller on each valve is exercised. A drawback of this system is that the set size is fixed. Thus, the irrigator cannot change the number of gates flowing from irrigation-to-irrigation or year-to-year.

On irregular shaped fields (e), place the valve so an equal number of acres are on each side of the valve. With this option, the cycle times are the same for each side but the number of furrows per set on each side is inversely proportional to the furrow length. For example, if the furrows are 300 feet long on the left set, and 900 feet long on the right set, there would be one-third as many furrows irrigated per set on the right side. Another way of dealing with irregular shaped fields is to place the valve in the middle of the pipeline and have different cycle times for each side of the valve (f). The goal should be to apply the same amount of water on each side.

Finally, if there is adequate slope in the pipeline and the gated pipe does not flow full, the surge valve can be used as a gate valve to stop flow part way across the field (g). When released to the downstream side, the flow must be below the gates in the first section and thus, surge can be accomplished. This is similar to a cablegation system, but the plug would have only two locations and gates would be opened and closed with each new set.



**Figure 2. Possible surge installation system installations**

## Additional Considerations

There are some other considerations in installing and maintaining a surge system. Many of these items are covered in detail in literature provided by the manufacturer.

- Remember that the controller is solar powered. Keep weeds, crops or structures from shading the controller. Clean mud or dust off the solar panel as needed.
- Charge the battery only according to the manufacturer's guidelines. Doing otherwise may harm the battery or void product warranties.
- Secure the valve using ring locks, chains or stakes.
- Secure the gated pipe. The on-off pulses have a tendency to cause the pipe to move around, and perhaps separate, more so than with continuous flow.
- Follow the manufacturer's guidelines for off-season storage of the valve.
- Consider adding the surge valve to your insurance inventory list. If the valve is vandalized or

damaged due to weather or accidents, it should be treated like any other piece of farm machinery.

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