

The Problem

The closure of a valve at the downstream end of a long pipeline generates a pressure surge, which may exceed the safe operating pressure of the pipe.

When the pipe is long, or the normal flow velocity is high, the closing time of the valve must be extended considerably to avoid dangerous pressure waves, oscillating along the pipe.

The standard closing restriction device, such as nozzles and needle valves, may be insufficient when conditions are very adverse.

Design Considerations

Choose the "SP" addition in case:

- The pipe is longer than 2000m
- The flow velocity is higher than 1.5m/s
- The pipe pressure rating is low.

It is advisable to run a surge analysis if your system meets the above conditions.

DOROT'S Solution

The "SP" feature is added to the standard control circuit of float valves, remote controlled electric valves, and other automatic valve applications.

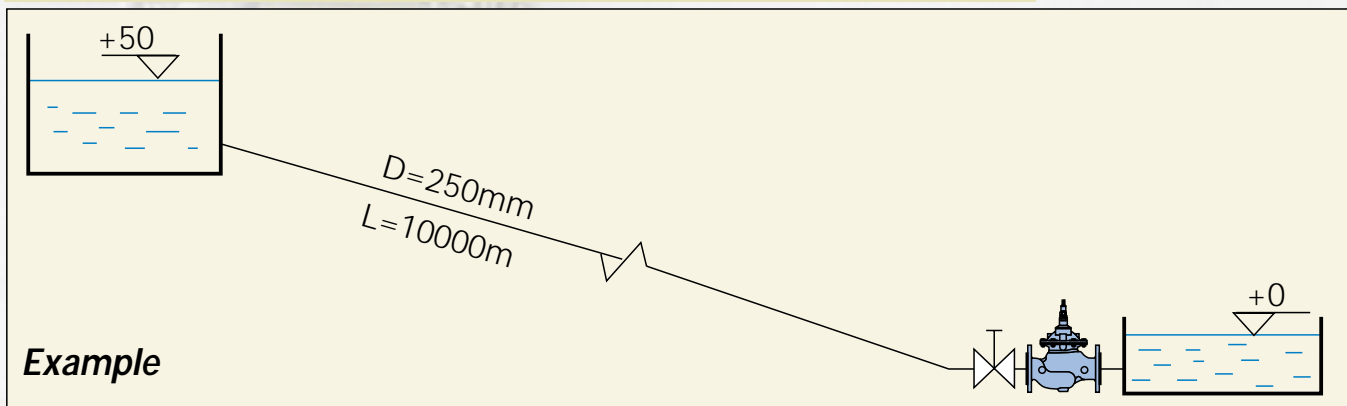
During valve closure, the valves senses upstream pressure. When the pressure exceeds the static pressure at the valve location, the "SP" Device instantly stops the closing process.

The closing procedure resumes when the pressure drops to normal.

In case of excessive pressure, the device re-opens the valve, operating as a quick-relief valve.

The above mentioned process generates the "closing stages", where the valve automatically adjusts its closure pace to meet the hydraulic characteristics of the network.

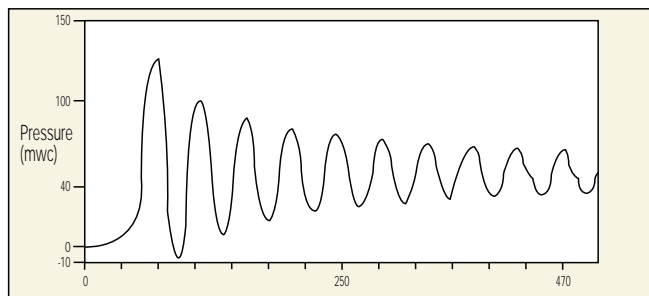
COMPARISON OF VALVE INLET PRESSURE



Example
A float-controlled valve, 250mm size, is mounted at the outlet of a 10Km long, 250mm steel pipeline. The pipe fills a reservoir from a dam, 50m higher than the reservoir. Normal closing time of the valve is 60 seconds.

Without "SP" Device

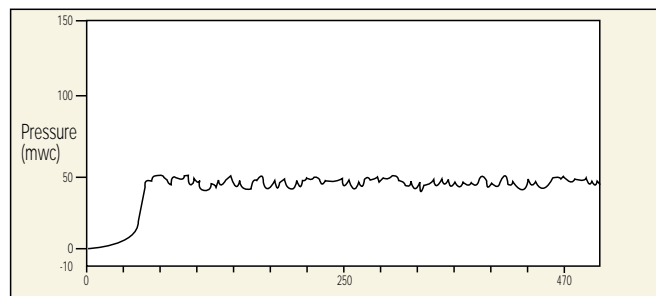
Pressure, following closure, in the inlet of a standard "FL" Valve.



Seconds following valve closure

With "SP" Device

Pressure in the valve inlet after the "SP" Device was added.



Seconds following valve closure