

Why do readings of flow meters fluctuate? A classic case at Davangere Sugar



Introduction-

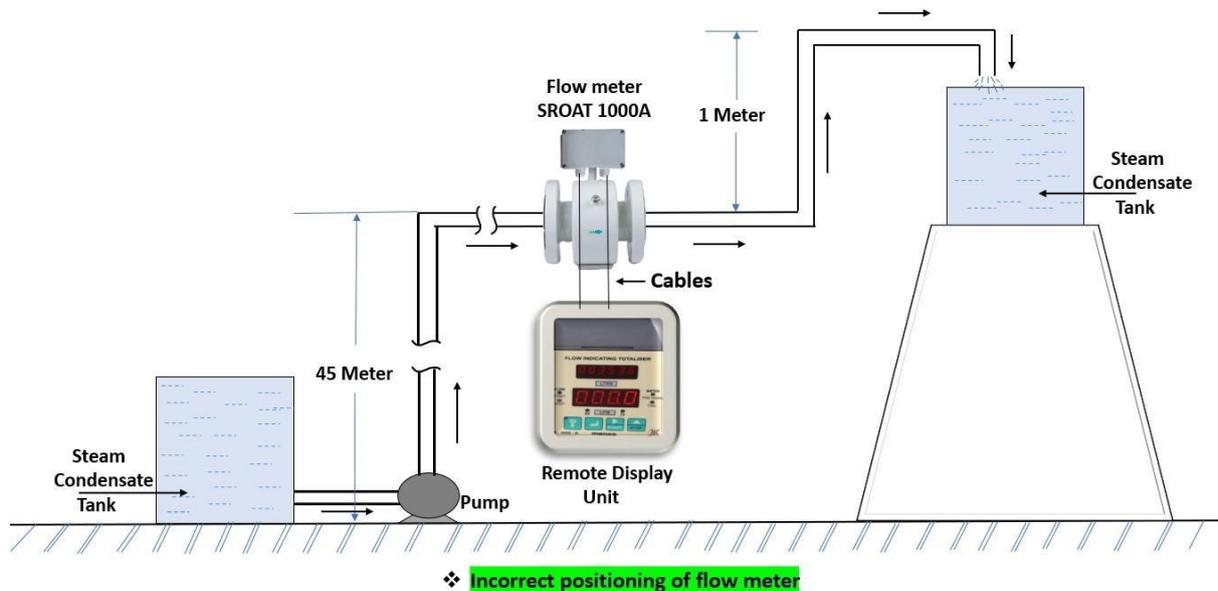
A normal sugar factory first concentrates crude sugar from the stick and afterward measures it further for an assortment of consumer and commercial needs. The factory cleans, cuts, hacks, and shreds the stick and afterward adds water before substantial rollers pulverize out the sucrose juice. The fluid is then blended in with different substances before additional refinement in a few complex advances that in the end make granulated sugar or different items.

With demand for sugar products growing worldwide, production is rising at several mills including one in the geographic area of Davangere sugar mill. The mill depends on steam heat as a part of its method that converts raw sugar cane into syrup, sugar, and related products. The waste remaining in this process is called bagasse. Bagasse is often used to produce heat and electricity in sugar mills (cogeneration). It may also be used for paper creating, as cows feed, and for producing disposable food containers. Currently, the pulp is especially used as a fuel within the sugarcane trade to satisfy its own energy necessities.

The Challenge-

The Mills production team wanted to measure steam condensate in an outer end tank. The condensate was pumped to the height of about 45 ft. - 50 ft. above ground level. The flow meter was installed at the end of the line where the condensate was collected in another tank. The condensate temperature was between 98°C to 99°C. The Electromagnetic flow meter used was a 4" line with PTFE liner. The problem

was, readings were fluctuating and the instrument person could not get exactly how much steam condensate was getting transferred.



❖ Incorrect positioning of flow meter
Fig. 1- Steam Condensate Delivery Measurement System.



Possible Causes Behind fluctuation in readings are-

1. Poor earthing of the flow meter.
2. Intermediate partial filling of the liquid inflow sensor.
3. In the case of an electromagnetic flow meter, the liquid ought to have some conductivity level. If conductivity is near zero, readings become erratic.
4. Air bubbles in the liquid.

Davangere’s production team contacted Manas microsystem to resolve the issue of readings fluctuations. Manas Microsystem is a manufacturer of flow meters and also provides repairs and calibration for flow meters. The team from Manas Microsystem visited the location of the flow mete and checked one by one the causes behind fluctuation.

1. Earth contacts were checked and it was found OK.
2. Checked partial filling of liquid but the installation conditions did not allow the pipe to fill partially during condensation.
3. The measured conductivity was around 2 to 3 μ S. So, there were chances of fluctuation of reading.
4. The fourth possible reason was bubbling in liquid. However, it was not possible because it was steam condensate, so there were no chances of this reason behind fluctuation.

The service engineer from Manas concluded that the reason behind the fluctuation of readings could be poor conductivity. But the specially designed transmitters for low

conductivity from Manas Microsystems were used for this application. So, the chances of this conclusion were very less.

Finally, it was found that the pressure of the condensate at the inlet of the flow meter was near atmospheric pressure and bubbling of water was occurring in condensate because of low pressure.

The solution that worked-

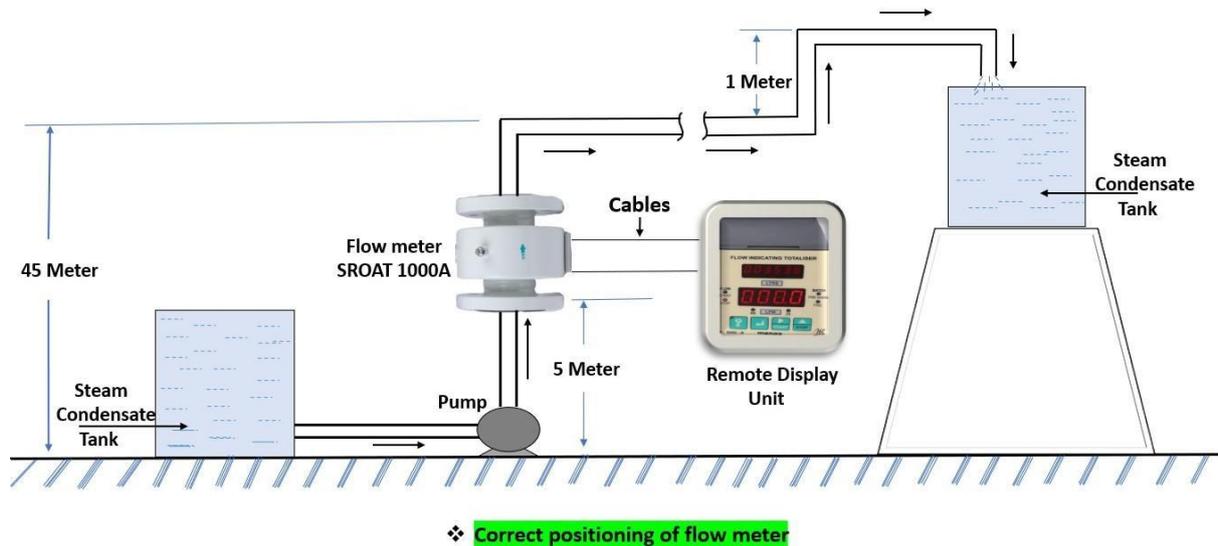


Fig. 2- Steam Condensate Delivery Measurement System.

As a remedy, the flow meter was shifted just near the outlet of the pump., This place was above 13 to 14 meters of the head. In that case, the chances of bubbling were nil. When the meter was installed in this condition it worked without any fluctuations.

Finally, the Manas Team was able to resolve the problem, and the flow meter was operational. The client was satisfied with the Manas team's support.