Attenuation Factor

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Finding Attenuation Factor

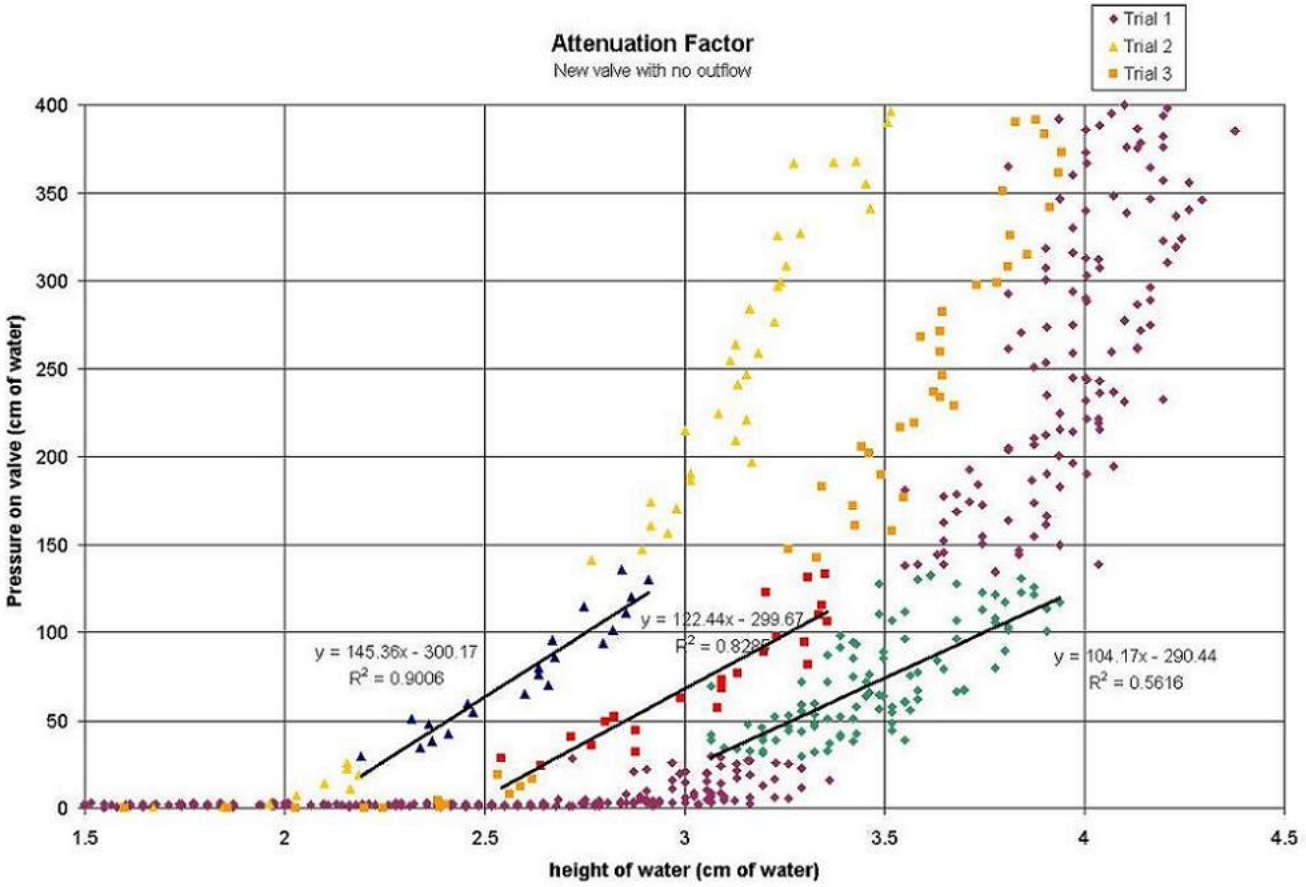
Introduction

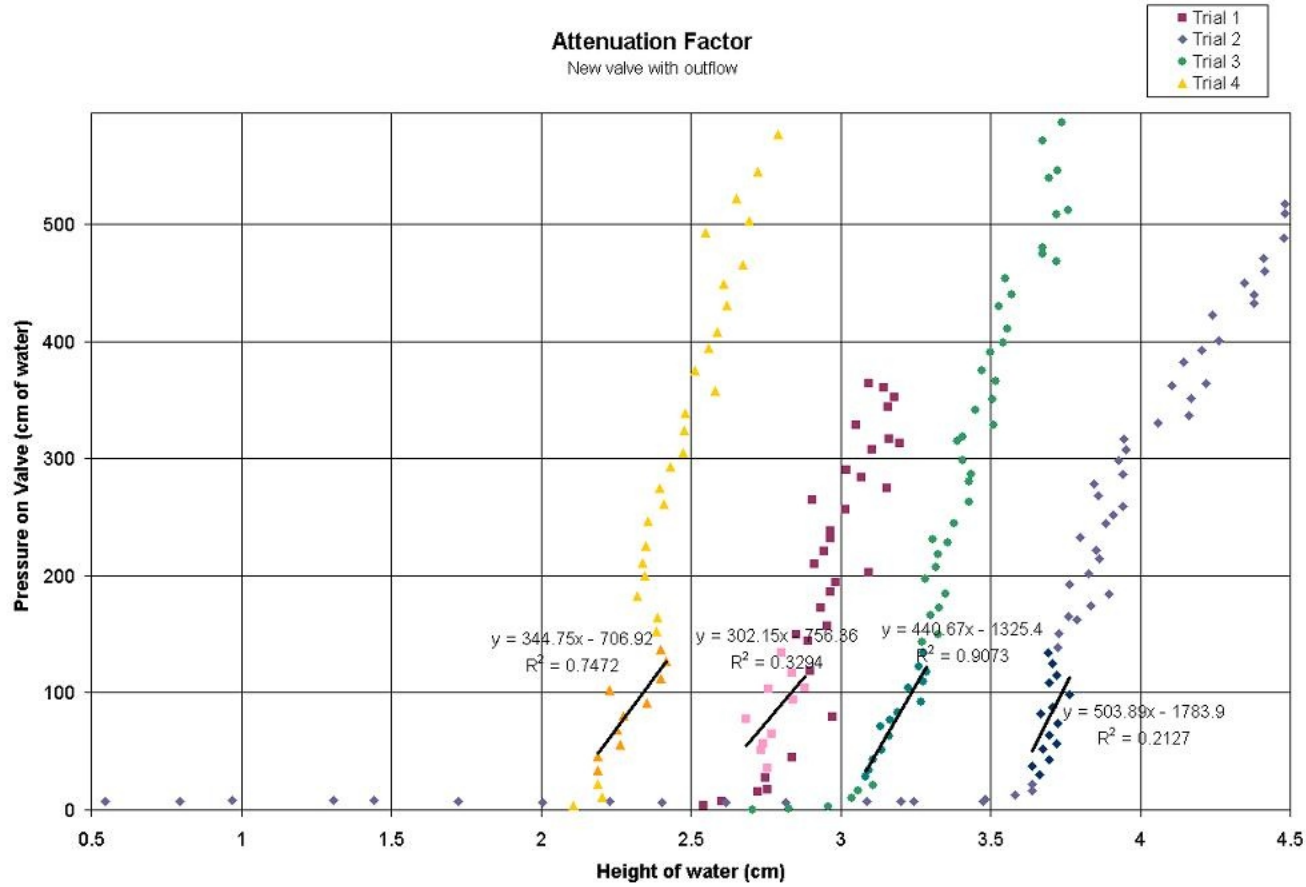
Until recently, the float valves used in the AguaClara's flow controllers were slightly flawed. The float valve connector included a compression nut, which was easily misplaced or misused, leading to leaks. A new float valve would preferably have pipe threads and be able to connect to a quick connect tube fitting. Furthermore, the float on the float valve was replaced in favor of another float, complicating post manufacturing assembly. A new float valve was found with pipe threads, quick connect tube fitting and had a more appropriate valve attached. However, before the new float valve was to be implemented, a study on the attenuation factor (change in pressure from stock tank over the change in pressure in the constant head tank) was to be conducted.

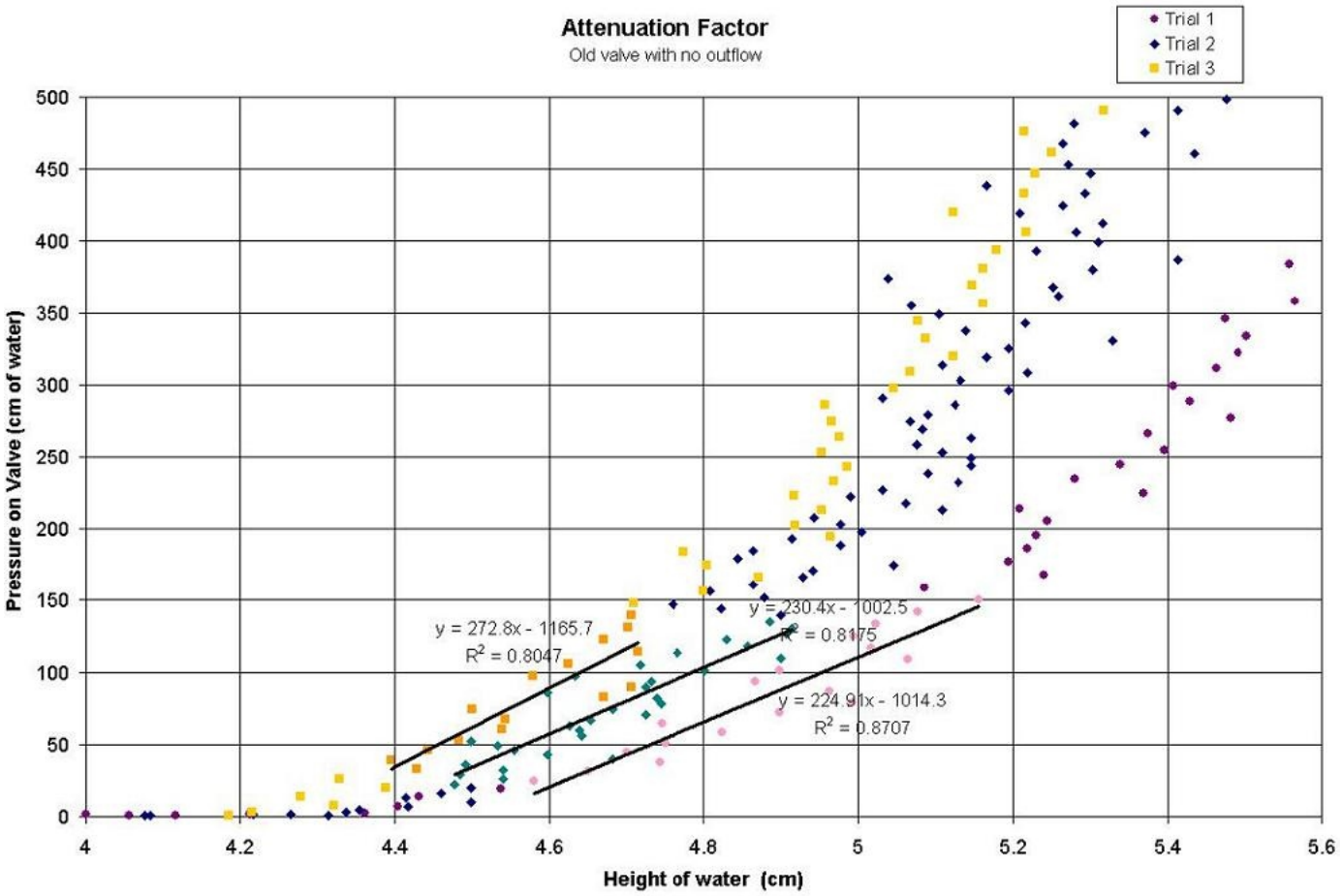
Procedure

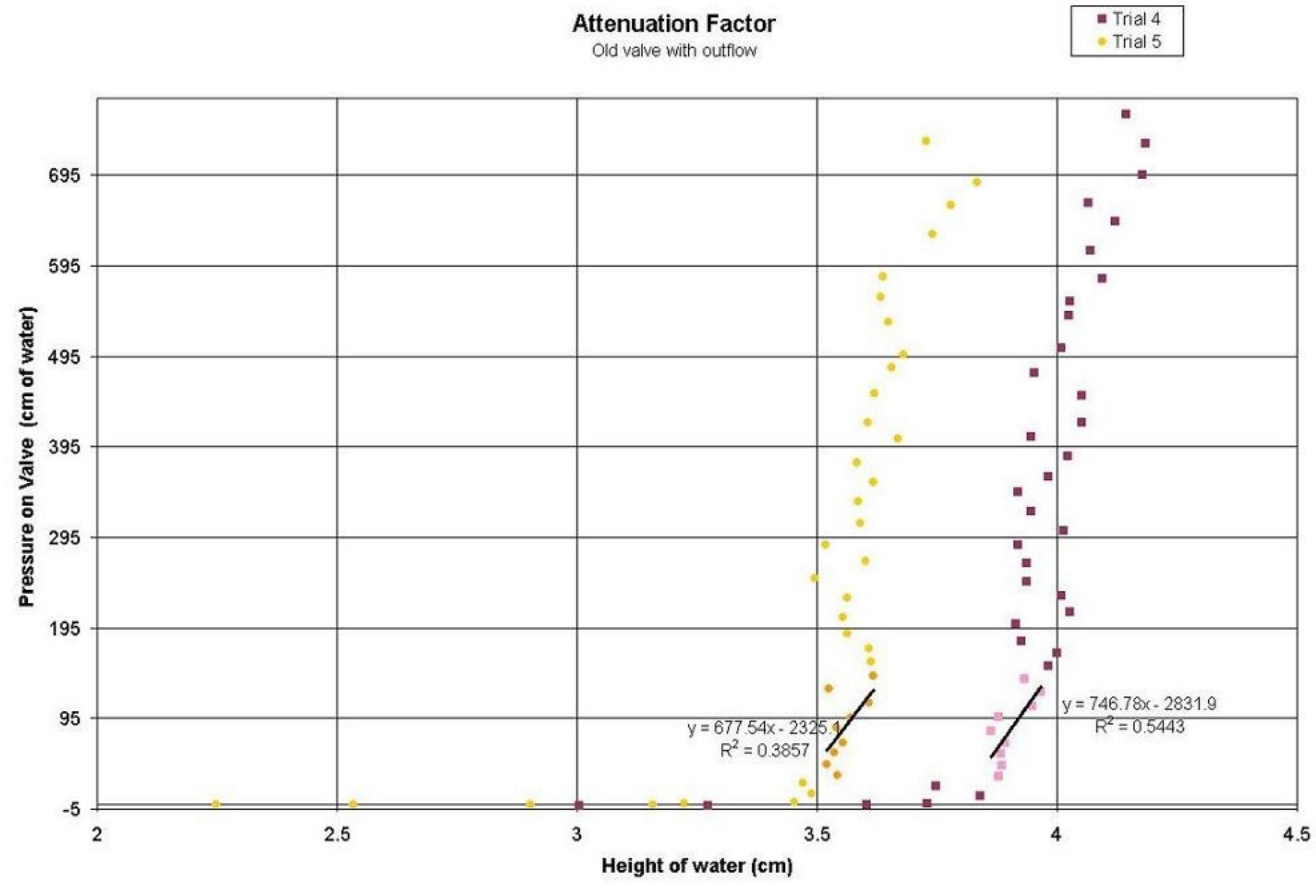
We followed the procedure for finding attenuation factor found on the Flow Controller Theory page. The set up consisted of a stock tank of water, a peristaltic pump, a constant head tank (using the desired float valve), a 200 kPa sensor and a 7 kPa sensor. The change in the stock tank was controlled by the peristaltic pump, which pumped water through the float valve. The 200 kPa sensor was attached to the inlet at the float valve and the 7 kPa sensor was attached to the outlet (either open or not open).

Results


Attenuation Factor
New valve with no outflow
Trial 1
Trial 2
Trial 3
Pressure on valve (cm of water)
height of water (cm of water)
y = 145.36x - 300.17
R² = 0.9006
y = 122.44x - 299.67
R² = 0.8285
y = 104.17x - 290.44
R² = 0.5616


Attenuation Factor
New valve with outflow
Trial 1
Trial 2
Trial 3
Trial 4
Pressure on Valve (cm of water)
Height of water (cm)
y = 344.75x - 706.92
R² = 0.7472
y = 302.15x - 756.86
R² = 0.3294
y = 440.67x - 1325.4
R² = 0.9073
y = 503.89x - 1783.9
R² = 0.2127





Valve	Outflow	Average Attenuation Factor
New	No	123.99

Valve	Outflow	Average Attenuation Factor
New	Yes	397.865
Old	No	242.7
Old	Yes	712.16

Conclusion

The attenuation factor of the new float valve with an outflow is low and leads to an error of approximately 2.5 mm. This is an acceptable error for use in Honduras, however a valve with a greater surface area would be preferred.

No labels