Pressure Management And Asset Life Improvement By Automating the Operation of pumping station

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Overview

- General Water Supply System Layout
- Challenges in Fixed Pumping Pressure Operation
- Improvements by Variable Pressure Control
- Results:
  1. Maintain Constant Network Pressure
  2. Efficient Operation
  3. Reduce Life Cycle Cost by Increasing Asset Life.

Water Supply System

Water Desalination Plant

Mega Reservoirs

Water Reservoirs

Pumping Station

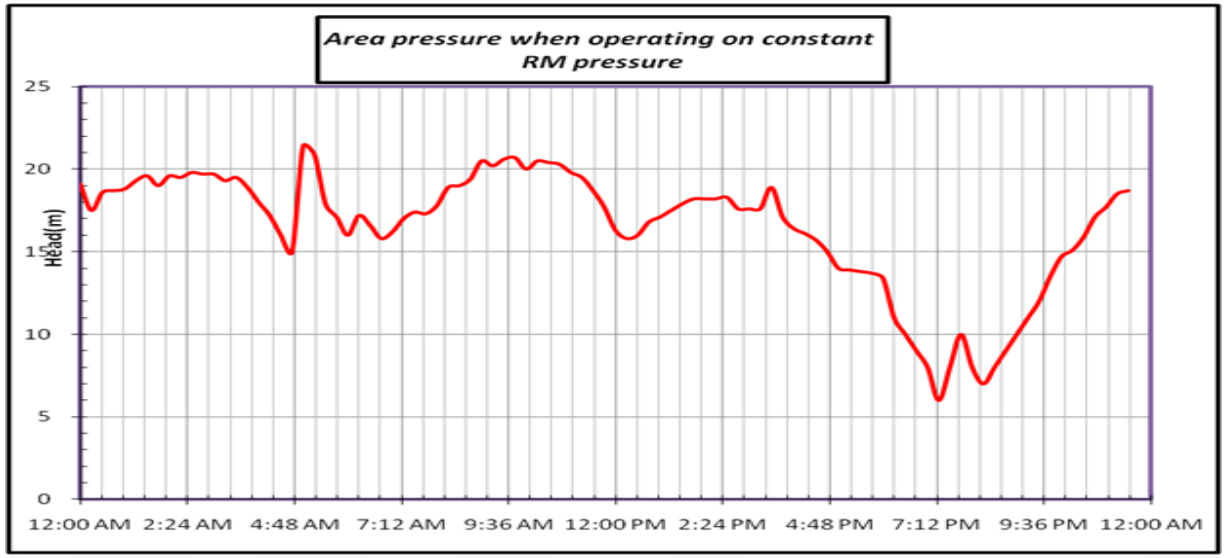
Customers

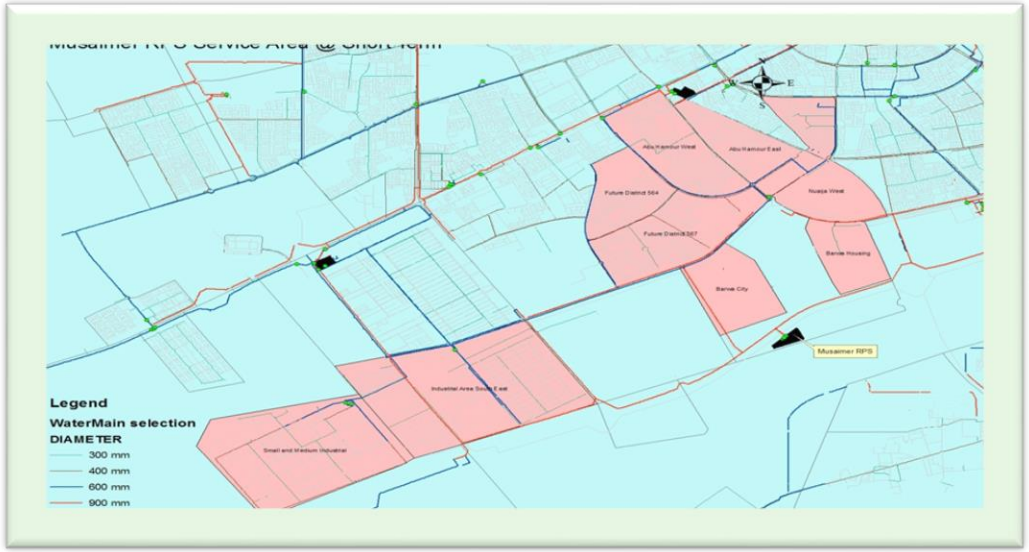
Tankers Filling Station

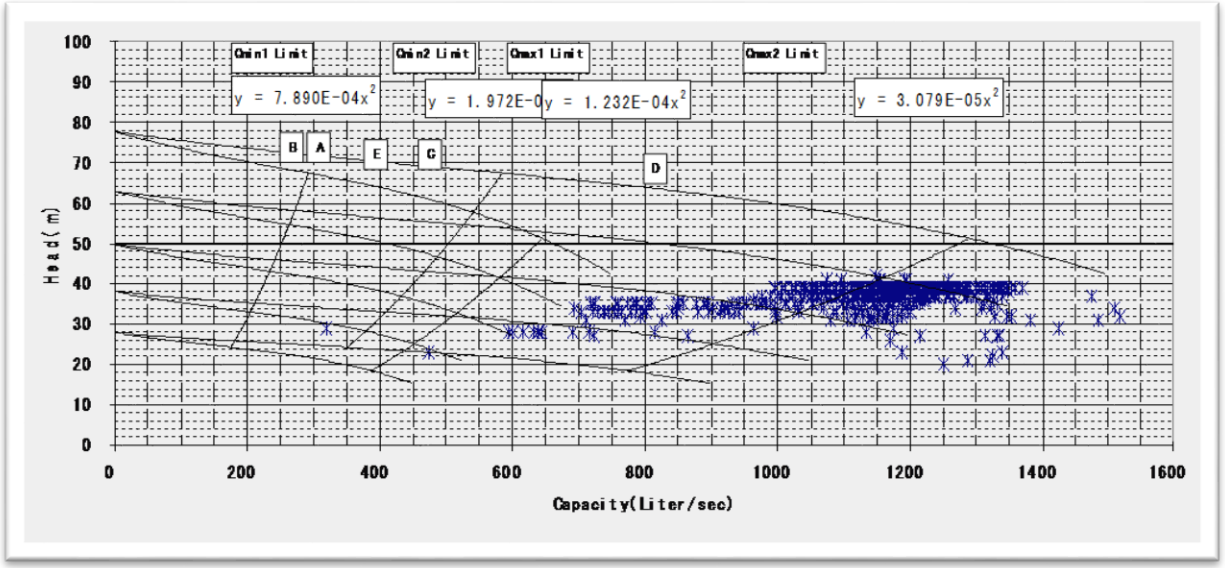
Water Towers

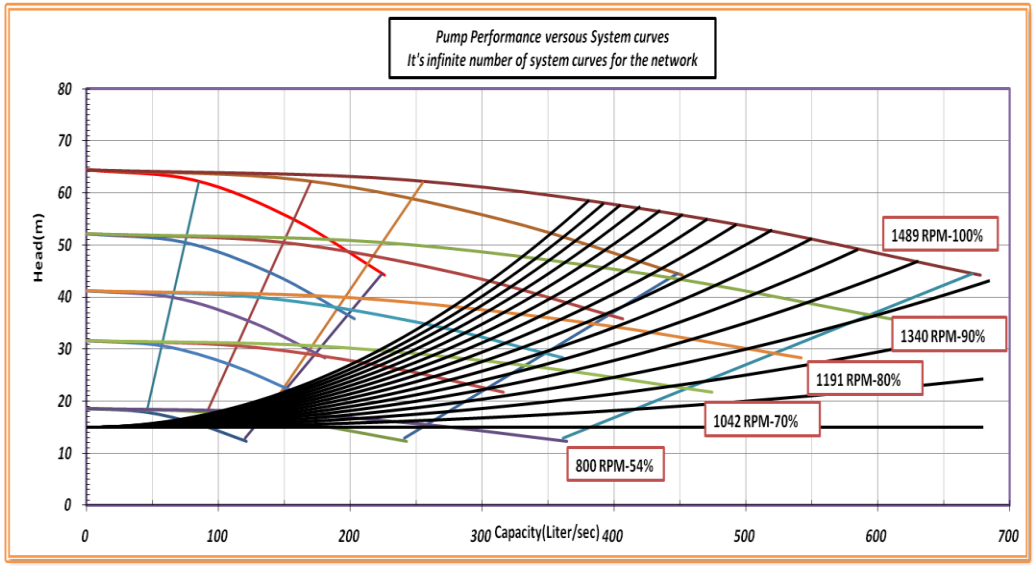
Water Distribution Network

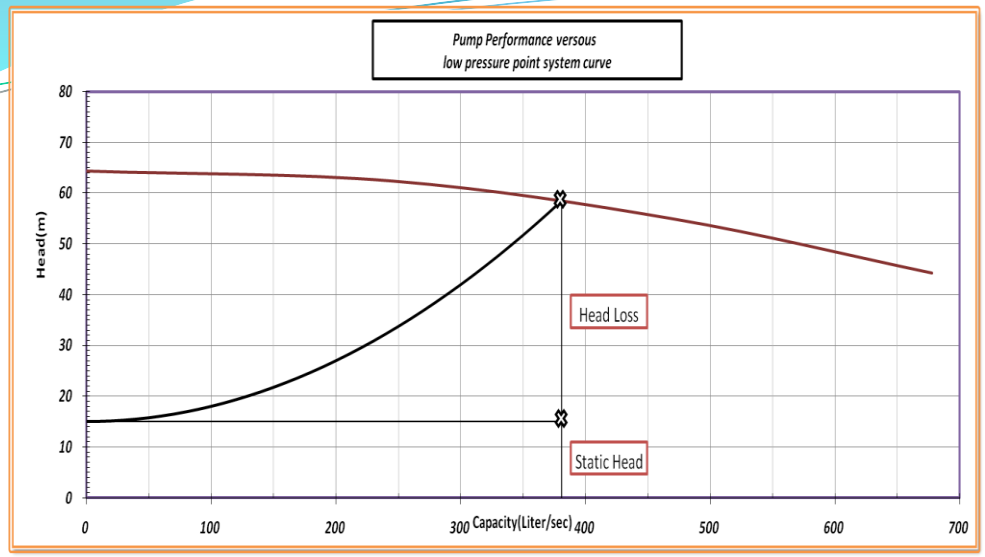
Fixed pressure pumping operation- variation in network pressure due change in day/ night demand

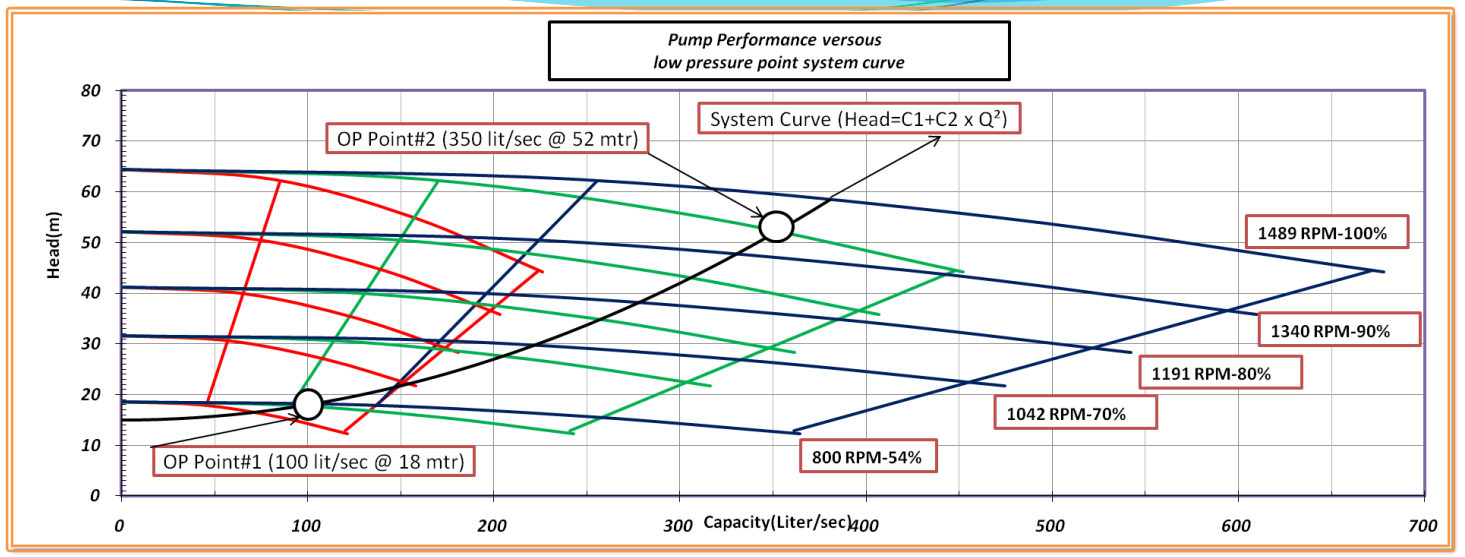












P_1=Static Head + Friction Head Loss

P_1=Constant1 + Constant2 xQ^2

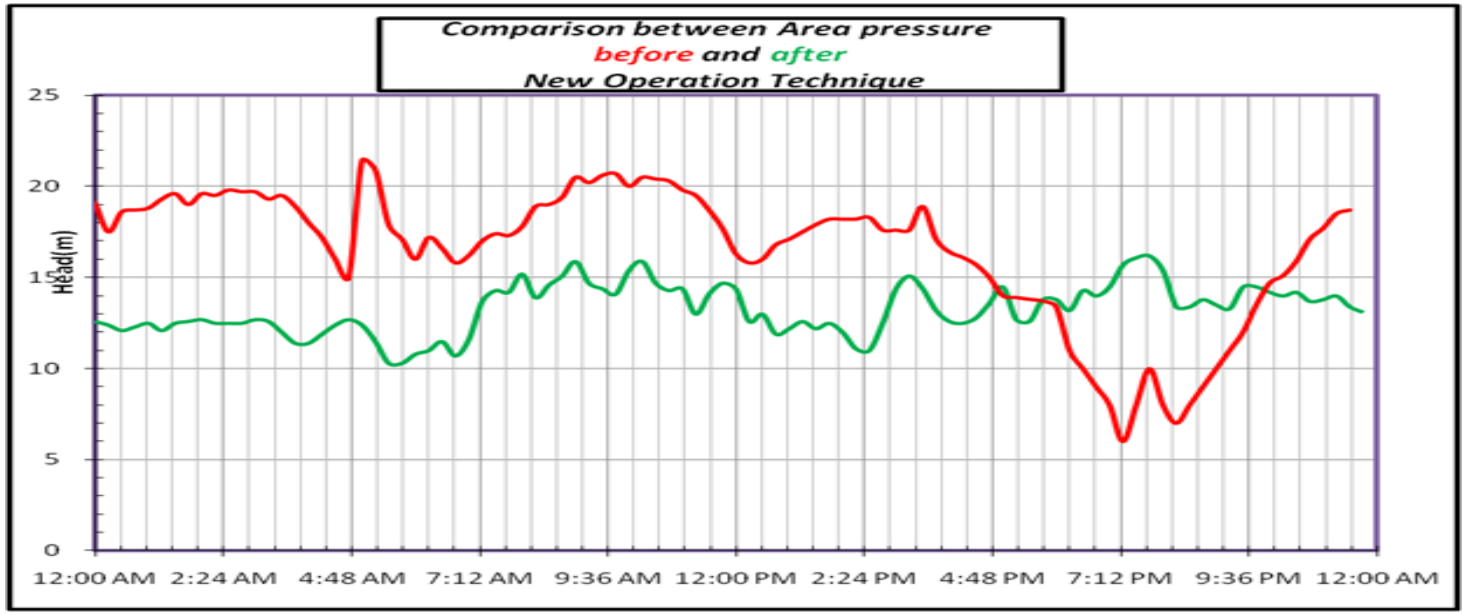
$H=C_1+C_2xQ^2$

$18=C1+C2x(0.1)^2$

$52=C1+C2x(0.35)^2$

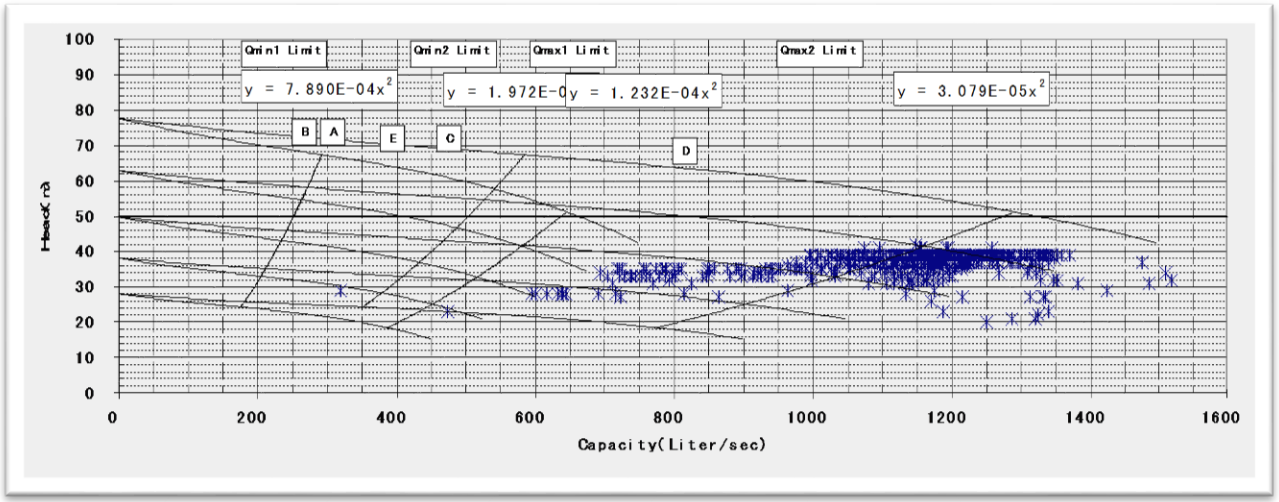
C1=15 & C2=302.2

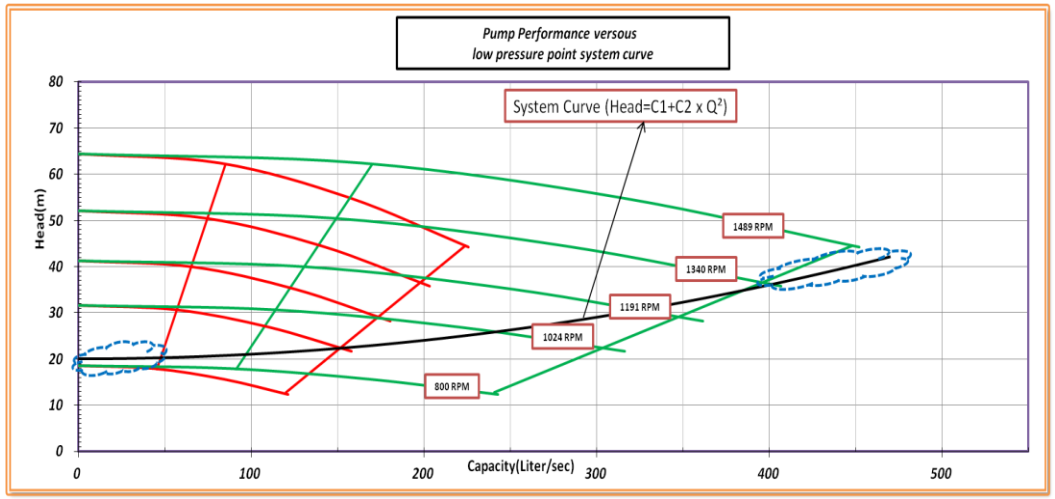
$H=15+302.2xQ^2$

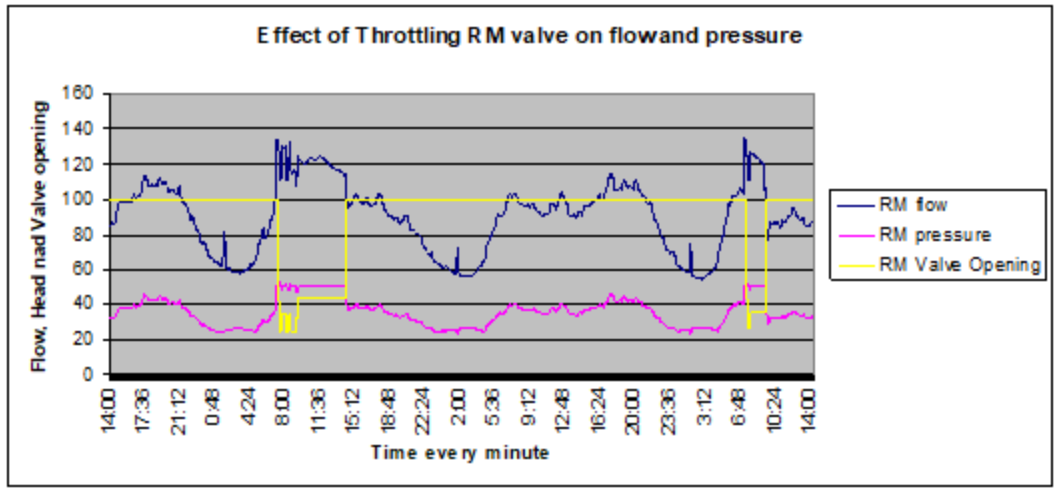


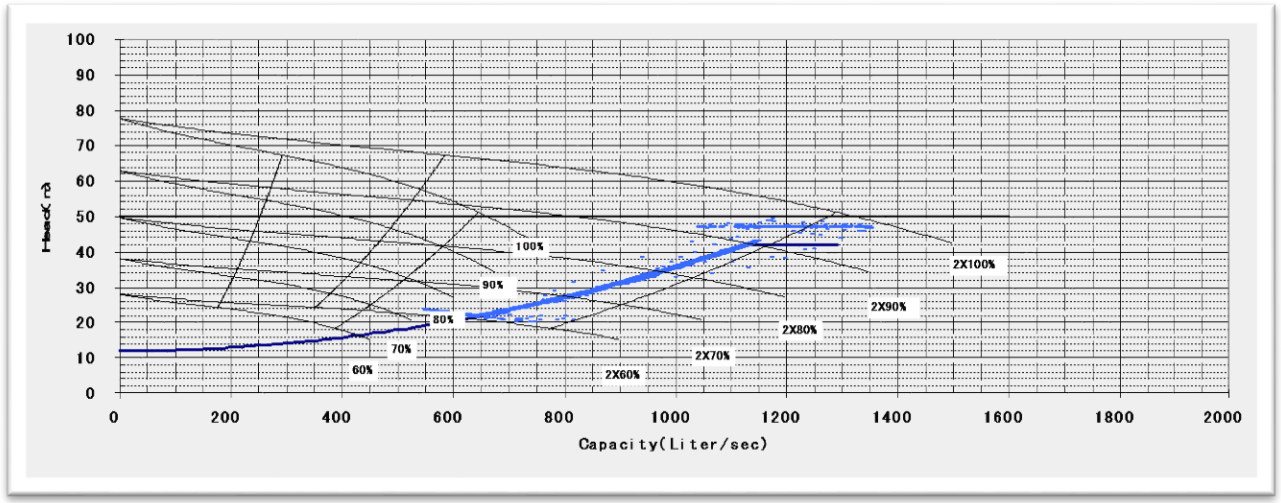
Variable pressure pumping operation- Maintaining uniform network pressure at varying demand

Efficient Pump Control within Recommended Operation Range









Benefits achieved by Applying new operation technique

1. Ensure Constant **pressure** at network critical point in 24/7 full auto operation.
2. Helps in KM target of **unmanned** station with minimum human interference
3. Intelligent system **responding** quickly to the network changes. Reduced the risk while handling shutdown works. NWCC just isolate affected area without stopping pump or reduce RPM.
4. PLC monitor network demand and calculate required pump head **every minute** and control the pumps / regulate speed.
5. Optimize network **pressure** as required, without over pressurizing, thus saving input power.
6. Operating pumps within **recommended range** prolong asset life, reduce maintenance
7. Operating pumps near best **efficiency point** resulting high system efficiency.
8. Reduced pressure **surges** in network resulting fewer breakdowns in pipelines.

Thanks & Regards