



# Dimensional Analysis and Similitude

**CVEN 311**

# Dimensional Analysis

---

- ▶ Dimensions and Units
- ▢  $\Pi$  Theorem
- ▢ Assemblage of Dimensionless Parameters
- ▢ Dimensionless Parameters in Fluids
- ▢ Model Studies and Similitude

# Frictional Losses in Pipes circa 1900

- ▶ Water distribution systems were being built and enlarged as cities grew rapidly
- ▣ Design of the distribution systems required knowledge of the head loss in the pipes (The head loss would determine the maximum capacity of the system)
- ▣ It was a simple observation that head loss in a straight pipe increased as the velocity increased (but head loss wasn't proportional to velocity).