Fire Protection Hydraulics and Water Supply Analysis

FPST 2483 Chapter 11

Elevated tanks

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Module objective

- Upon completing this module, the student should be able to understand:
  - Elevated tanks
- Reading materials
- Brock's book, chapter 11

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Elevated tanks

- Graphically representing the water supply available from an elevated storage tank.
  - Determine the height from the test location to the bottom of the tank; (Note: bottom of tank is used to be on the safe side since tank will only be full when flow first begins.)
  - Height to bottom of tank times 0.433 gives static pressure head.
  - Assume any reasonable flow and calculate friction loss from tank to test point.
  - Subtract friction loss from static pressure and plot result above flow used to get the friction loss.

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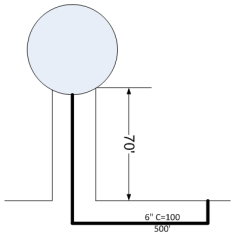
Elevated water tank



- Static pressure =70x0.433=30 psi
- Friction loss: @500',6",C=100 assume 500 gpm ➔Pf=7.0 psi
- Residual pressure @500 gpm is

  30-7=23 psi

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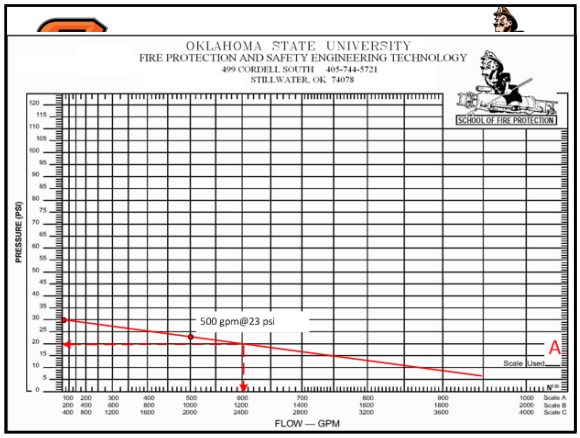

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Gravity tank

- In reality, a gravity tank seldom feeds a dead end main and most often supports an existing water system.
- Therefore, to graphically represent the contribution of the tank requires testing the existing system and the tank independently, then combining the results.

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Parallel supply

- Combining hydrant test data with supply available from elevated tanks
  - Plot water supply curve from test data with elevated tank turned off.
  - Plot water supply curve from test data with elevated tank turned on and city supply turned off.
  - At various pressures add the flows contributed by each supply.

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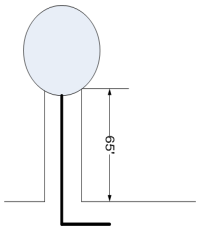
65x0.433=28 psi



- Note the flow test results must be adjusted to the elevation of the bottom of the tank so the results will be valid until the tank is empty.
- Also, the tank will not be considered contributing until city pressure drops below 28 psi.

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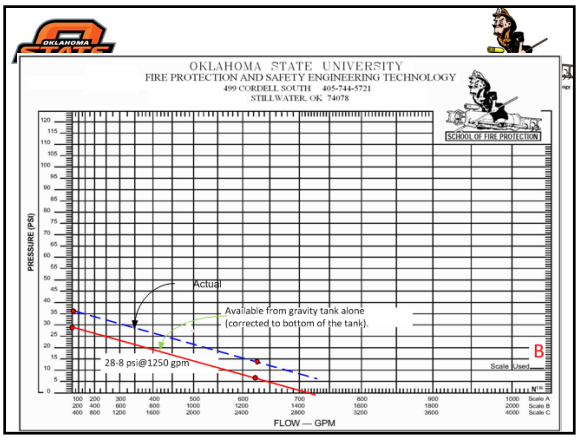

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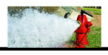
Combined water supply

- City water supply: Static 68psi, Residual = 12 psi with 800 gpm
- Water tank: 65 ft high, 8” pipe (C=100, D=8.23”), L=1300 feet





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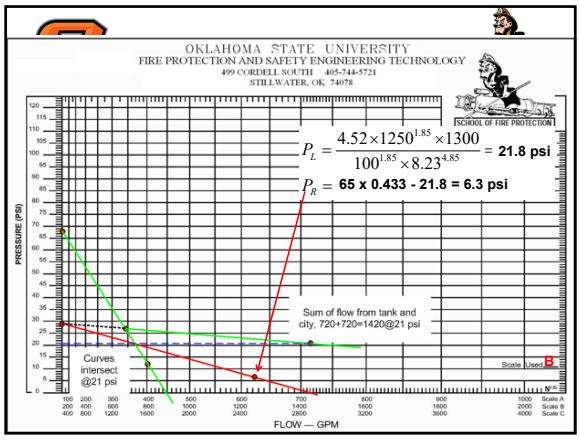

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