Chapter 8: Standpipe Systems

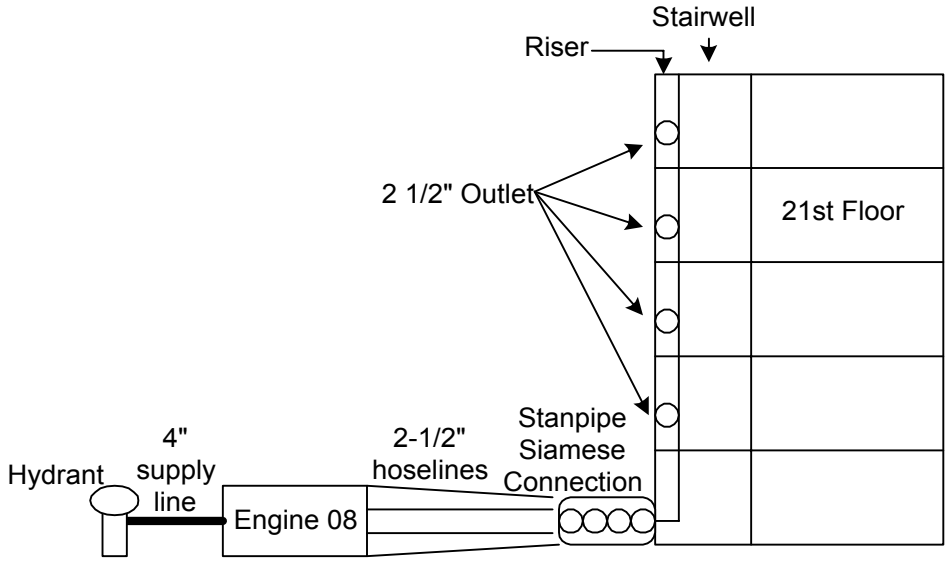
General Remarks

1) Where required
   a. Tall Buildings
   b. Large Buildings
   c. Special Occupancies

2) Enforcement in Hawai`i
   a. Building Department – Uniform Building Code
   b. Fire Department – Uniform Fire Code

Types of Standpipe Systems in Hawai`i

1) Dry Standpipe System (designed for Fire Department use)
Dry standpipe systems are required in certain types of occupancies and are installed to help provide a water supply throughout the occupancy. A dry standpipe system provides 2 ½" hose outlets to each floor of a building. These outlets are connected to a pipe, called a riser, which is connected to a siamese connection located on the street level at the front of the building. When firefighters need water, a fire truck will have to connect to a fire hydrant (intake side of pump) and supply lines to the siamese connection (discharge side of pump). Once the fire truck begins discharging water to the siamese connection, water will fill the risers and will be distributed to all the 2 ½" outlets. Each outlet has an individual shut-off, and firefighters can connect their firefighting lines to the desired outlet. Once the hoselines are connected and in place, firefighters can then open the 2 ½" outlet to allow water to flow through their hoselines.



The following are guidelines for dry standpipe systems:
   a. Required in buildings 4 or more stories
   b. Riser Size (pipe) 4 – 6 inches (found within stairwells)
   c. Fire Department Siamese Connection
      i. Located on street front of building
      ii. 2 or 4 way connection for Fire Department use
   d. 2 ½" hose outlets for each riser
      i. 1 per floor level (optional for 1st floor)
      ii. Roof outlet requires a two-way 2 ½" connection

2) Wet Standpipe System (designed for occupant / tenant use)
Wet standpipe systems are similar to the dry standpipe system, but there are a few differences. Wet standpipes have hose cabinets on each floor. These hose cabinets contain 1" fire hose with a nozzle. In case

of a fire, tenants can open the hose cabinet, pull out the hose and then open the valve allowing water to flow through the hose. With this having been said, this type of system requires that water be provided and pressurized up to each hose cabinet at all times. Buildings can either use county water pressure, or have some type of pressure booster, such as a pump.

The following are guidelines for dry standpipe systems:

a. Required in buildings 4 stories or more
   note: Not required in buildings equipped with an automatic sprinkler system.
b. Riser size (pipe) 2 – 2 ½"
c. Outlet (Fire hose cabinet) on each floor level
d. Building fire pumps may be needed to meet flow and pressure requirements (UL – Underwriters Laboratory FM – Factory Mutual)

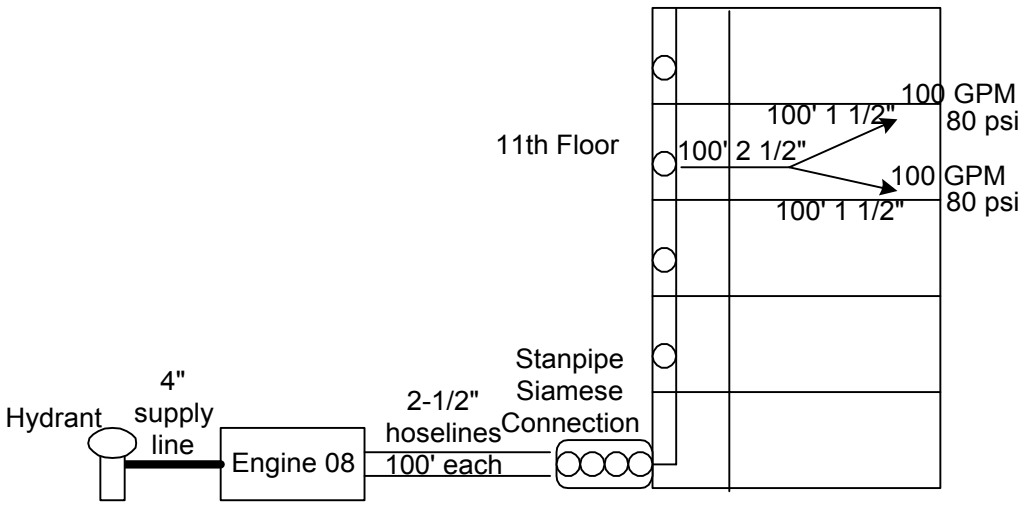
3) Combination / Combined Systems

It is not uncommon to find occupancies having a combination of systems for fire protection. Examples of combination systems are:

a. Combination System (Wet standpipe and Dry standpipe)
b. Combined System (Dry standpipe and Automatic Sprinkler System)

Pumping Operations:

The following is an example of a typical dry standpipe operation. Using fire ground calculations, figure out the engine pressure of a fire truck pumping this evolution.

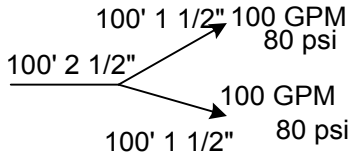


EP= FL (2 ½" hoses to siamese) 2 2-1/2" lines flowing 200 gpm 3 psi
FL (2 ½" hose on fire floor) 1 2-1/2" line flowing 200 gpm 10 psi
FL (1 ½" firefighting lines) 1 1-1/2" line flowing 100 gpm 35 psi
FL (Appliance for siamese) 25 psi
FL (Wye on the fire floor) 5 psi

BP (Back pressure 11 floors) 50 psi
NP (Nozzle pressure) 80 psi

Engine Pressure = 208 psi

note: The way I like to figure this one out is to break up the evolution into 3 parts.
First, figure the friction loss for the evolution on the fire floor.



Step 1: Find the friction loss in the wyed hoses
Find the average length of the wyed hoses
100 ft + 100 ft = 200 ft
200 ft ÷ 2 = 100 ft
1 ½" flowing 100 gpm = 35 psi / 100'
FL = 35 psi

Step 2: Find friction loss in 2 ½" hose
Total flow = 200 gpm (both 1 ½" hoses)
2 ½" hose flowing 200 gpm = 10 / 100'
FL = 10 psi

Step 3: Find NP and Appliance loss
NP = 80 psi
Appliance Loss = 5 psi (2 ½" to 1 ½" wye)
Total other losses = 85 psi

Step 4: Combine figures for steps 1 - 3
35 + 10 + 85
130 psi

Second, find friction loss for hoses supplying the siamese.

Step 1: Find the friction loss in the siamesed hoses
Find the average length of the wyed hoses
100 ft + 100 ft = 200 ft
200 ft ÷ 2 = 100 ft
Find the flow for each 2 ½" hose
200 gpm (both 1 ½" hoses)
divided by 2 (number of siamesed hoses)
Each hose is flowing 100 gpm
2 ½" flowing 100 gpm = 3 psi / 100'
FL = 3 psi

Step 2: Find Appliance loss
Appliance Loss = 25 psi (siamese connection)

Step 3: Combine figures for steps 1 - 2
3 + 25
28 psi

Third, find back pressure and add this figure to the totals of the above steps.

BP = 10 x 5 (fire on 11th floor = 10 floors above ground)
BP = 50

Now we can add all the figures from the 3 parts.

Part 1 = 130
Part 2 = 28
Part 3 = 50
Total = 208 psi