Experimental Procedure 2
Wednesday, November 13, 2013

Procedure:

Acid Solubility Test:
Source: (page 16) of AWWA b100

Materials:

- Funnel
- Large filter paper
- 6N HCl solution
- 100 g sample of sand
- Deionized water
- 2 500 g beakers

1. Weigh a piece of large filter paper and record the mass. Place the filter paper over a funnel and the funnel over a waste beaker.
2. Fill second beaker with 100 g HCl solution.
3. Record the mass of a sample of sand so that it is roughly 100 g.
4. Pour dry sand into the solution so that the sand is submerged.
5. Stir the beaker contents occasionally and allow to stand for 30 minutes.
6. Pour solution over the filter paper. Continue to add deionized water to rinse the beaker and pour it over the filter paper to remove all particles of sand from the beaker.
7. Rinse the sand in the filter paper with more deionized water.
8. Place filter paper and wet sand in oven to dry.
9. When the sand is dry, record the mass of the filter paper with the dry sand on top.
10. Preform calculations. If the percent lost due to acid is less than 5%, the sand passes.

DATA:
Mass of filter paper (g):
P =
Mass sand (initial) (g):
I =
Mass of sand + paper (final) (g):
T =

CALCULATIONS:
Mass of sand (final) (g):
(T – P) = F =
Percent lost to acid (%):
(F / I) * 100 =

Porosity Test:

Materials:

- Graduated cylinder (with gradations of .1 mL)
- 150 mL beaker
- 100 g sample of sand
- Water

1. Use the graduated cylinder to add the sample of sand to the beaker. Record the volume of the dry sand.

DATA:
Volume of dry sand (mL):
S =
Volume of water (mL):
W=

CALCULATIONS:
Total Volume (mL):
(S + W) = T =
Porosity:
S / T =

2. Use the graduated cylinder to add water to the sand sample. Record the volume of water added when the water just reaches the top of the sand.
3. Add the volume of the dry sand to the volume of water added to the sand. This value is the total volume.
4. Calculate the Porosity of the sample.

Unifomity Coeff (K) and Effective Size (D10)

Materials:

100 g sample of sand
Pan
Lid
Sieves: No. 4, 10, 20, 40, 60, 70, 200

1. Record the mass of roughly 100 g dry sand (Wt).
2. Record the original mass of each clean sieve (Wp).
3. Arrange a set of sieves in a stack with largest pore size on top, with a pan under the smallest pore size.
4. Pour the sand sample through the stack of sieves.
5. Shake the stack of sieves for 5 to 10 minutes with the lid on top so no sand escapes the stack.
6. Weigh sand in each sieve and in the pan (W).
7. Calculate the sand caught on each sieve (Ws) by subtracting the sieve weight (Wp) from the combined weight (Wc).
8. Calculate the percent retained by each sieve.
9. Calculate the percent passing by subtracting the percent retained PR from the values in the previous column (PL). The PL values are the P values from the row above.
10. Graph percent passing for each sieve versus pore size.
11. Using the graph, determine the pore size where 10% of the sand passes (d10) and where 60% of the sand passes (d60).

Data from graph:
D10 (mm) =
D60 (mm) =

Calculations:
Effective size
(d60) =
Uniformity coefficient
(d60/d10) =

Uniformity coefficient test:
Total dry washed sand (Wt) (g)=

Sieve No.	Pore Size (mm)	Original mass of sieve (g)	Sand and sieve (g)	Sample Weight (g)	% retained	% passing last larger sieve	% passing
		Wp	Wc	Wc – Wp = Ws	(Ws / Wt) *100 = PR	PL	PL – PR = P
3.5	5.6					100	
10	2						
20	0.85						
30	0.6						
40	0.425						
60	0.25						
pan							