In this laboratory, you will perform gradation analyses on the fine and coarse aggregate that we will use later in the course to make asphalt concrete and portland cement concrete. You should arrive with the appropriate data sheets for this lab already printed out. The filled-in data sheets must be checked by me before you leave the lab. I will average the results from all of the groups and post the “official” results on the course website Thursday evening after the last lab. Everyone will use the “official” results for completing the homework.

**Crushed Stone Gradation:**

You will be given a 5-gallon bucket containing approximately 70 lb (32 kg) of crushed limestone with a ¾” nominal maximum aggregate size (NMAS). Use ASTM C702 Method B to reduce this sample to the size needed for the gradation analysis (see ASTM C136 or Table 4-5 in the textbook). Put all of the discarded material back into the bucket as you go along. Obtain the weight of the reduced sample and enter it on the appropriate data sheet where it says “Initial Sample Weight.”

Sieve the aggregate using the screen shaker sitting in the middle of the sieving room floor. Use the 1”, 3/4”, 1/2”, 3/8”, and No. 4 screens plus the pan and let the shaker run for at least 5 minutes to ensure that the aggregate is completely sieved. Remove the screens from the shaker one at a time (starting at the top and working your way down the stack), and deposit the material into the metal pan provided. As you add material to the pan, determine the mass of the accumulated aggregate and record it in the column marked “Cumulative Weight Retained”. When you are done, the final mass of aggregate must fall within 0.3% of the initial sample mass you recorded earlier; otherwise, you will need to repeat the test.

Once you’ve determined that the test results are acceptable, please put the sieved material into the red plastic bucket provided so it can be used for Lab 2 next week.
Gravel/Concrete Sand Gradation:

Obtain a sample of either gravel (Groups 1, 2, 3) or concrete sand (Groups 4, 5, 6) using the sample size guidance presented in ASTM D75 (or Table 4-4 in the textbook). The gravel is located in the middle bin in the sieving room and has a nominal maximum aggregate size of 12.5 mm (½"). The concrete sand is contained in a couple of 5-gallon buckets located in the rightmost bin in the sieving room and has a nominal maximum aggregate size of 4.75 mm (which is a No. 4 sieve).

Next, use ASTM C702 Method A to reduce this sample to the size needed for the gradation analysis (see ASTM C136 or Table 4-5 in the textbook). Put all of the discarded material back where you got it from. Obtain the weight of the reduced sample and enter it on the appropriate data sheet where it says “Initial Sample Weight.”

Meanwhile, clean all of your sieves. For sieves with fewer than 100 openings per inch, use the stainless steel brush provided; for the No. 100 and No. 200 sieve, use the horsehair brush provided. Assemble the stack of sieves beginning with the pan on the bottom and followed by the No. 200, No. 100, No. 50, No. 30, No. 16, No. 8, No. 4, 3/8", and ½" sieves.

Pour your sample into the stack of sieves, put on the lid, then place the stack in the green “Mary Ann” sieve shaker in the corner of the sieving room. Let the shaker run for at least 5 minutes to ensure that the aggregate is completely sieved. Remove the stack of sieves from the shaker, then remove one sieve at a time (starting at the top), and deposit the material into the pan provided. As you add material to the pan, determine the mass of the accumulated aggregate and record it in the column marked “Cumulative Weight Retained”. When you are done, the final mass in the pan must fall within 0.3% of the initial sample mass you recorded earlier; otherwise, you will need to repeat the test.

Once you’ve determined that the test results are acceptable, please put the sieved material into the plastic bag provided so it can be used for Lab 2 next week.