ARCH 4620  OBSERVATION AND DESCRIPTION OF CLAY PROPERTIES
Due Feb 19

Goals: To practice observation and description using ceramic materials.
To understand the properties of clays used in ceramic production.

Objectives: To observe and describe properties of clay.
To evaluate the relationship between the different clay properties.

A fundamental part of any type of research is observation and description. This lab is designed to give you an opportunity to practice describing a material type. You will use an established set of variables to describe different clay types. In addition, by comparing different clays you will gain a better understanding of clay properties that are important in ceramic production.

Instructions

Documenting Differences in Clay Types
1) Measure out 200 grams of each clay type.
2) Describe the particle size of each clay type. Are the clays coarse or fine relative to each other?
3) Add water until the clay is plastic. Record the amount of water (ml) added.
4) Describe differences between the clay types that you see and feel.

Measuring Shrinkage during Drying
1) Line the mold with cellophane.
2) Fill mold with each clay type to make a test brick. Make sure to pack the clay in tightly.
3) Draw a 100 mm line down the center of the brick, placing perpendicular marks at 0, 50, and 100.
4) Weigh the brick; record the weight.
5) Every day, record the length of the line. Note whether the line is changing symmetrically.
6) Every day, record the weight of the brick.
7) Describe other changes in the appearance of the brick.
8) Plot the change in the line length over time.
9) Plot the change in weight over time.
10) Calculate shrinkage % = \frac{\text{original length} - \text{measured length}}{\text{original length}} \times 100 \text{ for each day.}
11) Plot the change in shrinkage %.
12) Calculate the average shrinkage % for each clay type by calculating the mean for the last day’s shrinkage % measurement.
13) Calculate the average weight loss for each type of clay. Calculate the total weight loss = \frac{\text{original weight} - \text{last day’s weight}}{\text{original weight}} \times 100 \text{ for each brick. Then calculate the average weight loss for each clay type.}

Documenting the Effects of Temper
1) Weigh out 200 g Red Art Clay.
2) Add water until the clay is plastic and workable.
3) Add a specified quantity of sand. Each group will add a different amount of sand.
   Group 1  40g = 20%  
   Group 2  50g = 25%
Group 3  60g = 30%
Group 4  80g = 40%
Group 5  90g = 45%
Group 6  100g = 50%
Group 7  120g = 60%
Group 8  130g = 65%
Group 9  140g = 70%
Group 10  160g = 80%
Group 11  170g = 85%
Group 12  180g = 90%

You may have to add more water after you add sand.

5) Make a test brick in the mold.
6) Draw a 100 mm line down the center of the brick, placing perpendicular marks at 0, 50, and 100.
7) Write the temper % on the brick.
8) Weigh the brick after you take it out of the mold; record the weight.
9) Measure the lines on bricks every day; record length.
10) Weigh the bricks every day; record the weight.
11) Describe the changes in appearance of the bricks.
12) Calculate shrinkage % = \(\frac{\text{original length} - \text{measured length}}{\text{original length}}\) x 100 for each day.
13) Plot the change in total shrinkage % for each temper percentage.

**Lab Write Up**

**Results**

It is in this section, you should present the data and graphs.

Describe and compare the differences in shrinkage, appearance, plasticity, and particle size between the clay types. If possible, summarize the information in a table.

Describe and compare the differences in shrinkage and appearance between the bricks with differing amounts of temper.

**Discussion**

Use the information on clays, temper, shrinkage and drying presented in the three articles (Rice 1997, Obstler 1996, and Scott) to explain the differences that you described in your results section. For example, why does one clay type shrink more than another?