**The Impact of Materials on Society**

**Review and Concrete Activities**

**Readings and Homework Assignments**

**Making Concrete**

The goal of this exercise is to give everyone the opportunity to fabricate a material and test its toughness. The material is concrete which as you know is a composite. The test is what is called an impact test and is used to measure the energy absorbed upon breaking (ie the toughness).

We will meet in the building space between the Materials building and the Mechanical engineering building just to the west of the Reitz Union ground floor outdoor colonnade.

Wear clothes that might get dirty. You will work in your groups. We will be making 2 concrete bars for each group. The first bar will be made with no reinforcement. You should keep track of roughly the ratio of cement to sand to gravel by volume you used (write this down somewhere). We will see how this affects its toughness. You may use any ration you want that you think will give you the toughest concrete.

The second bar will be made again with cement and aggregate and you can reinforce it with anything you want to use to make it stronger (except rebar). In the past people have brought in everything from popsicle sticks to marshmallows (didn’t work very well) to palm fronds to plastic bags etc. The goal is to experiment how reinforcements affects the toughness.

**Class Activity on Friday, October 9**

**Breaking Concrete**

We will break all the bars in class using an impact test. To do this we need to be extremely efficient. Each group will have people who load the bars, hold the measuring stick, drop the hammer, film the process using their phone and record the data. You will be required to by the end of Friday (Oct. 9) to turn in a short report (1 page) which discusses what you used to make each bar, your observations from the breaking process, the height of the sledge hammer before and after it strikes the bar and the calculated energy absorbed (energy absorbed = change in mass time gravity constant times height) (mgh). Use the mass of the sledge hammer in kilograms, g=9.81m/s2 and the height difference in meters to get the energy absorbed in joules. Include your conclusions on the reinforced sample as well.

We have a large number of groups so we need to be very efficient. Should be an adventure.