EM375 Project
DELIVERABLES FOR THE PRELIMINARY FIRING CURVES

The following is a summary of what is to be submitted as the *"Preliminary Firing Curves"*. One submission per group. Although this submission is "preliminary," your work should be as close to "final" as you can make it. Credit will be assigned for numerical accuracy as well as the style and quality of presentation.

1. SUBMIT the FOUR PLOTS identified on the next page. There is to be one plot per page (full page) with properly labeled axes and units. Axes are to be scaled to fit the data and grid lines are to be printed to allow for easy use in the field.

2. FOR EACH PLOT, ALSO SUBMIT a separate page (one per plot) showing one representative calculation. You should present this calculation using a MathCAD worksheet formatted as an enclosure.

3. SUBMIT A TABLE of the actual numbers and units you used for the following:
   - Ball diameter
   - Ball mass
   - Pouch mass
   - Mass of one 6-ft section of large tube
   - Cross sectional area of large tube
   - Strain hardening material constants
   - Air density.

If any of the above numbers are derived (e.g. mass derived from measured weight, or ball diameter from circumference) **you must include both the measured quantity and show how you converted it to the required quantity.**

The plots that make up the firing solution are:

Graph 1: Launch speed (y-axis) vs. stretch ratio (x-axis) for values of l from 1.0 to 2.5. Make sure your MathCAD worksheet includes your calculated launcher efficiency, h.

Graph 2: This graph must have 3 curves that show launch speed (y-axis) vs. impact distance (x-axis). One curve for each of three different launch angles, 10, 20 and 30^{o}. The minimum range will be 100ft and the maximum will be 200ft.

For the field day you will be given a launch distance and a launch angle. Your calculations and graphs will help you determine the required stretch ratio.