

EM375 Project FINAL REPORT REQUIREMENTS

One submission per group.

The following sections from the “Format and Style for Technical Reports,” August 1998, will comprise the final report for the project. Some additional explanatory comments are provided.

1. Title page.
2. Abstract. Write the abstract last. Remember that the abstract is a *stand-alone* document that highlights the main points, results and conclusions *of the report*. Remember to write the entire report (including the abstract) in the third person.
3. Nomenclature. List all the symbols used in the report, and their meaning. The symbols should be listed in alphabetic order, with the roman symbols first, followed by the Greek symbols. Use the common symbols that have been used for the past three months, like α , β , and λ , etc. Learn how to use a word processor to do this. Points will be deducted for penciling in Greek symbols or copy/pasting from the web-published pdf files.
4. Introduction.
5. Theory. Describe the equations and assumptions used for calculating the initial speed that the slingshot can give the ball (Launch speed vs. stretch ratio). Then write about the projectile motion and the derivation of the differential equations that needed to be solved numerically. Summarize as to how the Range vs. Launch Speed curves were produced. Equations should be written with the word processor’s equation editor. Points will be deducted for penciling in equations.
6. Procedure. Describe the procedure that you used only on field day.
7. Summary of results. This should be a table that summarizes your results from field day. Make sure you include your theoretical results from your firing curves as well as the actual achieved results.
8. Discussion of results. How well did your actual results match your predicted results? Discuss potential reasons why your firing curves might have been off, referencing the uncertainty analysis in the appendix. Which variables contributed the most to range uncertainty. Subjective reasons, such as the rubber tubes on the full scale launcher being “old” and not having the same material properties as the tested sections can also be included. **This is a major section of the report.**
9. Conclusions. The conclusion is a final summary of what was included *in the report*. There should be *nothing new* in the conclusions. If you want to include

something new in this section, you must first write about it in the main body of the report.

10 Appendices.

Appendix A: List all the physical dimensions used in the project. Where you show a derived quantity (e.g., mass), first show the actual measurement you took (e.g., weight). Then show the conversion and the derived quantity. Remember to include dimensions (units). As a minimum, include 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 (cite reference)
- Launcher physical dimensions

Appendix B: Final firing curves. Make these graphs as professional as possible – pride is the keyword. For MathCAD graphs, remove the arguments from the axes and use labels and legends. Make the graphs large and easy to read. You may find it a good idea to Copy&Paste the MathCAD graphs in to your word processor.

Appendix C: A sample calculation for computing the launch speed from stretch ratio. A MathCAD scratch sheet is acceptable, but it must have comments and use proper symbols and show units. Use the insert text feature.

Appendix D: A sample calculation for computing range from launch speed/angle. A MathCAD scratch sheet is acceptable, but it must have comments and use proper symbols and show units.

Appendix E: Complete uncertainty analysis of the range as a function of launch angle and stretch ratio.

Appendix F: Write a brief statement about each of the team member's individual contributions to the overall effort.

FINALLY Attach the (graded) preliminary firing curves. These do not form part of your final report, but are required to be submitted with your report for completeness.

DO NOT copy and paste anything from any project handout. If you do, you will be severely penalized.