Perhaps the greatest obstacle that presently confronts the engineer is that of communication. The greatest discovery of the century is valueless if the discoverer is unable to present his discovery to others. Therefore, all engineers must be able to present their work in a form that is complete and easily understandable. One absolute requirement for the completion of an education is a demonstrated ability to write a report. Many practicing engineers have had occasion to refer to their laboratory reports. Write for your own future utility. What you will want to know from the report 5 to 10 years from now is just what any interested reader expects to learn from your report.

You are personally responsible for fulfilling the requirements of completeness, understanding and conciseness. However, the following general form of a report has proved adequate in many engineering problems.

M. Zenouzi
Youngstown State University
Winter 1991

1. FOLDER COVER

The cover should prepare the reader for the contents of the report. The name of the report and author(s) should appear below the report title.

2. ABSTRACT

An abstract is a very critical part of a report. The purpose of this section is to summarize the problem and the conclusions resulting from your laboratory investigations of the problem.

Many people only read the abstract to determine whether or not the report should be read in detail. Do not slight the work you have done by presenting an inadequate abstract. Remember with modern computer data retrieval systems such as “Leadermart” the abstract is the only information about the work that a reader may get. It should, therefore, be a capsule review of the entire study.
3. TABLE OF CONTENTS

Table of contents and indexes are probably not needed for reports less than 6 or 7 pages. If it will help the reader quickly find important information, include the appropriate table of contents and index.

4. INTRODUCTION

The introduction should supply the necessary background material to prepare the reader for what is to follow. It should describe the problem, precisely what it is you are trying to do, why and how. This section states and substantiates your experimental goals. The balance of the report is devoted to the pursuit of these goals.

5. THEORY

Every experiment you perform will be an attempt to associate a measured phenomenon with a analytical model described by some physical analysis. This analysis usually takes the form of a mathematical model of the phenomenon.

Usually, a mathematical model has already been postulated and is available in several texts. However, this fact does not relieve you of the responsibility of presenting the presently accepted model. Liberal use of acceptable reference is expected in this section.

The theory section is where you put the notation and analysis of published reference(s) with proper acknowledgment. The handouts (lab project specifications) which introduce you to the lab are not suitable references. It is up to you to explain the underlying assumptions and to develop any departures from fundamental analysis which you may require.

6. EXPERIMENTAL APPARATUS AND PROCEDURE

Describe the equipment and how it works. Outline any unusual experimental techniques or procedures. Describe the test specimens (DUTs -- device under test) and the range of variable covered in the test.
Try to point out those features which give your equipment individuality by pointing out differences from other similar equipment or features which make its performance less than ideal.

The equipment manufacturer, serial numbers, and model numbers should be recorded during the project.

7. RESULTS

The results of the investigation should be presented in either graphical or tabular form. Present the results so that what you have accomplished is immediately apparent. You must compare the analytical model with your results. This should be on or in the same chart or table as your experimental results. You should show a sample calculation of how your data is reduced to the final form.

8. DISCUSSION OF RESULTS

This is the most important section. At this point, the experimental results are assumed to have been correctly obtained and reduced for presentation. If this is found not to be the case, return to the laboratory in do it all over again!

Once the data is adequately obtained and reduced, it represents the target toward which the theory strives.
9. CONCLUSIONS

This section summarizes comparisons of theoretical and experimental results (usually, but not always, in percent differences). Include any positive statements concerning the results of the experiment. Statements like because of thus and so the data is accurate to plus or minus this many percent work well in this section.

After the abstract, this is the most popular part of the report for an engineer to read.

10. RAW DATA

All data should be collected in a laboratory notebook. This has the tear out carbon papered sheets (usually yellow colored). Each page must be signed and dated. Here is the place to write everything down. Strange odors, how the weather is and how you feel... etc. Here is where everything is documented. This is the legal foundation for your formal report and anything else concerning your work from now on.

11. APPENDIX

Anything that does not add to the presentation but you feel still should be included in the report should go here. Long items and supporting background information should also go here.

12. GRAPHICAL PRESENTATION OF INFORMATION

Each item must have a figure number. Try to spread out the graphs, charts and pictures to avoid a cluttered look. Often put one item per page.

Acknowledgment:

A good 90% of these guidelines have been copied and paraphrased from the work of M. Zenouzi of Youngstown State University. Also N.Snyder of Premix Corp. and KSUAC contributed much effort. We thank both for their good work and their permission to use this work here at KSU-A. R.Burhanna.