A CD STYLE GUIDE AND REFERENCE

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Preface

This document is a collection of information pertinent to the presentation of the results of your research and development efforts. You have been asked to explain your ideas to others in a concise and coherent manner. Your presentation will require the ability to communicate your thoughts to others who may come from a variety of different backgrounds. Our major concern is that important information is clearly presented so that the impact of your efforts is maximized. This implies that the quality of your presentation must not detract from the impression given. This document was originally intended to inspire college engineering students to improve their technical presentations. However, it contains ideas that can use a little reaffirmation from time to time and links to a number of sources that contain a wealth of information.

It is true that some presenters are so talented and accomplished that they are able to gain more influence or receive greater support than their efforts or knowledge merit. This raises the issue of professional ethics. The engineer must not destroy the faith that others have in his/her accomplishments. What we seek, therefore, is an eloquent, honest, substantive presentation.

There is nothing new here. You can use this document as a resource tool and a “heads-up” as to what your career is all about. To be credible, your work must be repeatable by others; your notes must clearly show set-up and results of your experiments and efforts; and, for legal reasons, your technical notes must be constructed in such a way that they will be accepted by the court as valid and true regarding experiments at a particular place and time.

For those interested in improving their writing, I recommend the following resource materials: The Chicago Manual of Style, and The Elements of Style by Strunk and White. These texts are discipline neutral. You will see that you should have no difficulty in using the internet to find texts specific to you interest.

1. INTRODUCTION

An engineer's life is punctuated with requests to write reports and make oral presentations. Initially, a graduated engineer will most likely be involved with projects at the production level. At some point, however, he or she will become involved in project management. This level of engineering requires an expanded vocabulary, new tools and additional responsibilities. The senior project will address some of these aspects and is intended to create awareness of real world requirements.

This manual consists of a collection of materials that might normally escape the attention of an otherwise diligent student. The collection is far from complete, but it emphasizes some primary issues and offers the reader some excellent references for further information.

Many students regard the required writing activities as unnecessary distractions from their technical efforts. This attitude generally stems from an intense interest in their chosen field and a strong desire to work productively and use their newly accumulated knowledge. However, a competent engineer needs to be able to collect his or her thoughts, organize ideas, and craft them into a form that will convey desired information to a specific audience. This manual is intended to be useful to the student engineer and the practicing engineer as well.

Herbert Hoover, the 31st president of the United States and a mining engineer, comparing engineering with other professions, made the following whimsical observations:

The great liability of the engineer compared to men of other professions is that his works are out in the open where all can see them. His acts, step by step, are in hard substance. He cannot bury his mistakes in the grave like the doctors. He cannot argue them into thin air or blame the judge like the lawyers. He cannot, like the architect, cover his failure with trees and vines. He cannot, like the politicians, screen his shortcomings by blaming his opponents and hope that the people will forget. The Engineer simply cannot deny that he did it. If his works do not work, he is damned. That is the phantasmagoria that haunts his nights and dogs his days. He comes from the job at the end of the day resolved to calculate it again. He wakes in the morning. All day he shivers at the thought of the bugs which will inevitably appear to jolt its smooth consummation.

On the other hand, unlike the doctor, his is not a life among the weak. Unlike the soldier, destruction is not his purpose. Unlike the lawyer, quarrels are not his daily bread. To the engineer falls the job of clothing the bare bones of science with life, comfort and hope.

Source: Memoirs of Herbert Hoover, vol. 1, *Years of Adventure*, Macmillan Publishing Company, 1951.

2. ENGLISH GRAMMAR

2.1. Our Language

English usage changes with time. This means the usage that students become accustomed to may not yet be acceptable in publications. The publishers of English dictionaries tend to move new words, and the new use of old words, into the useable language domain fairly quickly and their most recent editions should be used as the definitive sources.

Your writing style may detract from the results of your efforts. Always keep in mind that what you write will reflect upon you, your department, and your company.

Only the most common and most disturbing errors in English usage are shown here. It is recommended that students review their English texts and the references listed in this section.

2.2. Split Infinitives

In his book *Modern English Usage*, Fowler stated (1):

The English-speaking world may be divided into (1) those who neither know nor care what a split infinitive is; (2) those who do not know, but care very much; (3) those who know & condemn; (4) those who know & approve; & (5) those who know & distinguish.

An infinitive consists of a verb preceded by "to" as in the following: "to think" or "to drive" or "to go." When another word is inserted to modify the verb, such as "to boldly go" an infinitive is said to be split.

Excessive use of split infinitives is tiresome and diminishes your writing. Do not split infinitives needlessly and only if you cannot express a thought or explain a process without using the inserted modifier.

2.3. Dangling Prepositions

Dangling prepositions are considered unacceptable in formal writing. Make a strong effort to re-word a sentence so that the preposition follows the indicative noun as closely as possible.

Incorrect: She is the person I spoke with.

Correct: She is the person with whom I spoke.

2.4. Nouns as Verbs

We don't bicycle, automobile or SUV to work. We don't elevator to the floor of our office. We don't chalk the boards or eraser our mistakes. So, why do we input data to the computer and output the results? The primary reason is that it is, at least for the moment, the most efficient way of expressing a process.

Strunk and White have the following to say (2):

Many nouns have lately been pressed into service as verbs. Not all are bad, but all are suspect. [Compare first version (bad) to the second version (better).]

Be prepared for kisses when you gift your girl with this merry scent.
Be prepared for kisses when you give your girl this merry scent.

The candidate hosted a dinner for fifty of his workers.
The candidate gave a dinner for fifty of his workers.

The meeting was chaired by Mr. Oglethorpe.
Mr. Oglethorpe was chairman of the meeting.

He headquarters in Newark.
He has headquarters in Newark.

She debuted last fall.
She made her debut last fall.

Originally, input was considered a noun that described the raw materials used by a factory. Similarly, output was a noun. Electronics and computers have changed their definition and use in sentence construction.

The following cartoon reminds us that engineers are not the only ones concerned with this problem.

2.5. Quotation Marks Enclose the Ending Punctuation

When using quotation marks, it is a rule that any punctuation which might be used at the end of the quotation if the material were not in quotation marks is included inside the quotation marks. This includes the periods at the end of sentences when the quotation is at the end of the sentence. “Be careful,” he said. “Sometimes it makes a difference.”

2.6. Possessive Forms and Contractions

For nouns, the basic rule to denote possession is to append **'s**.

The pronouns **it, their, your** and **our** denote possession by adding **s** without the use of an apostrophe.

Note that the word **it's** always implies the contraction for **it is** and is never used to show possession.

Use of contractions such as **don't, isn't, aren't, doesn't, can't,** etc. is best avoided in formal writing.

See Strunk and White (3).

2.7. Commas, Semicolons, etc.

There is a tendency to overuse commas. The basic use of commas is to separate dependent clauses from the remainder of the sentence. If a sentence is made up of two independent clauses that could be broken into sentences, the author should decide if it is better to separate them with a semicolon or separate them into two sentences. For an in-depth discussion, see Strunk and White (4) and Fowler (5).

2.8. Word Usage

If you cannot effectively communicate what you know, you lose the power to make a difference. Words have meanings. Choose your words carefully so that you write exactly what you mean. The right word in the right place is key to effective communication.

Widely published writers use a good dictionary, a thesaurus and books on English usage to improve their writing style. Do not get discouraged – get smarter – write so that your message will be simple, clear and unambiguous.

2.9. Sentence Structure

You have probably heard the conjecture that if you place a bunch of monkeys in front of a bunch of typewriters, eventually they will type every document that has ever been written. Your work here at the University is *not* a part of such an experiment.

We have already discussed the importance of using the right words. However, you must also put them together in such a way that they convey information to the reader. If you put them together in an *ineffective* fashion, the primary information you will convey to the reader is that you don't write very well.

Do not break the rules of grammar. Incomplete sentences are always unacceptable. Improperly placed adjectives and adverbs are disturbing, as are misplaced adjectival and adverbial phrases.

If every sentence is well constructed, then there still remains the organization of the sentences. The thoughts you wish to present to the reader should progress in such a way that the overall "picture" develops in an uninterrupted flow of pertinent and supporting information.

Remember that the reader will be very busy and will appreciate a document that delivers information quickly, correctly and efficiently. This will convey to the reader not only the quality of your technical skills, but that you have a talent for expressing your thoughts.

3. PROJECT MANAGEMENT

3.1. Environmental Considerations

Even if everything were currently environment friendly, every new product, every new business enterprise, every business expansion and every new use of natural resources must be evaluated vis-à-vis the environment. Major examples of concern for the environment can be found in every utility where environmental impact departments must provide extensive reports before any new facility can be built.

J. Forrester, a very notable Nebraska graduate who became a member of the faculty at MIT, simulated world economics and human survival. It was a major study, including all known world resources and projecting the discovery of new sources. In spite of efforts to adjust the model and obtain a steady state growth, the simulation showed major economic disasters occurring by the middle of the current century. Certainly, the challenges of the future will require understanding, exploration and innovation at substantial levels.

Unrelated to the Forrester model, there are many critics who have decried the rapid developments that attend progress. One group strongly supported placing the cost of disposal on the sales price of every item. However, the problem of determining the costs of disposal of all "products" including the construction (and destruction) of buildings and highways is incredibly complex. But times change and mankind will continue to be innovative in seeking solutions. For example, there are many scrap companies that have found that they can make a substantial profit recovering scrap metals (including the gold from computer circuits), and many utilities are involved in harnessing the energy from the wind.

Much of the future burden will be placed on engineers. It was decided several years ago that all senior projects must include statements to show consideration of the environmental impact if their products are to be considered for manufacturing.

3.2. Economic Considerations

While environmental considerations are concerned with human survival, economic considerations are concerned with business survival (which, by the way, is also related to human survival).

Engineers must have a reasonable understanding of all the elements that go into making a company competitive in the business scene. In a free enterprise system, a company must provide a quality product at a reasonable price in order to survive. Sensitivity to public needs and wants, sensitivity to what is perceived as quality and sensitivity to the factors that determine the price of a product, are desirable attributes in company employees.

Demonstrate your sensitivities when you write your reports.

3.3. Time/Completion

Projects must be organized into tasks and plans must include the planned starting and completion dates for each task. As an example, PERT (Program Evaluation and Review Technique), was credited with cutting two years off the construction of the first atomic submarine.

These techniques have evolved into other systems. The Critical Path Method (CPM) is very popular and includes the probabilities and associated costs for early or late completion on each task.

3.3.1. Pert Charts

PERT charts show all the tasks in graphic form. The tasks are plotted against a time axis and show the earliest start date for each task, the tasks which must be completed before this task can start, and the slack (additional time permitted to complete the task before it will delay the start of another task). All tasks with no slack form the critical path because any delay in task completion will affect the project completion date. See Appendix A-3 for a sample PERT chart.

3.3.2. Timelines

Timelines are similar to PERT charts except that the requirements of tasks that must be completed are not explicitly shown. Each task is represented by a line or bar and is plotted against a time axis, thus showing the expected start and completion times. Although not as informational as a PERT chart, it is quite sufficient for most relatively small projects. See Appendix A-4 for a sample Timeline chart.

3.3.3. Gantt Charts

Both the PERT chart and the Timeline chart can be accompanied by a Gantt chart that shows the manpower requirements over all tasks as a function of time. This becomes an important management tool that allows the managers to see the effect on manpower of moving tasks, generally adjusting the starting date on tasks with slack.

4. LAB BOOKS

4.1. Multipurpose

Lab books have several uses:

1. A personal record of what you have done in the lab.
2. A record for some other person so that he or she can repeat your experiment and obtain the same results.
3. A legal record to be used in patent action suits.

4.2. Acceptable Notebooks

Most companies will issue you a numbered notebook that you are to turn in to the company when it is filled. All pages will be numbered before it is issued to you. The company will then treat it as a document/book that can be checked out by other employees.

For your EE Labs at UNL, you should purchase a bound notebook similar to the standard composition notebook. Number all of the pages front and back. Reserve the first two pages to serve as an index.

4.3. Requirements for Legal Acceptance

Lab books do not require a professional appearance, but neatness is important. There is no particular format required, but they should contain:

1. Experiment preparation and references.
2. Circuits tested and results of the testing.
3. Notes on why you think the circuit is good or bad.
4. Enough information for someone else to duplicate your experiment and obtain the same results from the tests you performed.
5. For use in court at a later time:
   a. Date the top of each page and at the line where new daily entries are being made.
   b. Do not leave any unfilled space. Fill each page or cross off (initial and date) unused space. It is acceptable to write a note at a later date, referring to the page in the notebook that carries an expanded explanation or additional experimental results that verify or invalidate a comment. Any notes added later must be clearly dated and initialed.
   c. Use both sides of a page; more information is available without turning pages. Whatever you do, be consistent to avoid complications in case of a court action.
6. Personal remarks are encouraged. (The lab book is an "informal" record and personalization can actually reinforce the appearance of veracity and authenticity.)

5. WRITTEN REPORTS

5.1. General Requirements

The principal purpose of a written report is to convey information to the reader in an efficient manner. Its construction must present information succinctly, clearly and well organized so the readers do not need to go back and forth in the report to understand the material presented. The writer must avoid ambiguity and excess wordiness. The content should also reflect respect for the readers, neither boring them with details they already know nor mystifying them with esoterica. To help with these aspects, the report includes an abstract intended for people outside the company and summaries for different levels of personnel within the company. Writing a good report is not easy, even for those with considerable talent. There are a number of books available to help people improve their writing ability. Most companies will ask their authors to follow a particular "Style Guide" that provides a consistency in the appearance of their reports and helps to establish high standards for their documentation.

5.2. Style Guides

There are many style guides available to students who need or desire a more detailed explanation. Most companies prepare documents for public use, most publishing organizations and most graduate programs have a preferred style guide. Some style guides are very thorough and become the basis for other style guides. The most frequently cited manuals of style are the *Chicago University Manual of Style* (6) and the Strunk and White *Elements of Style* (1). The principle style guide for Electrical Engineers is the *IEEE Standards Style Guide* (7) that governs all Standard publications of the IEEE. This guide also serves as a basis for the journals and transactions. Each transaction group, however, has its own style definitions

where the *IEEE Standards Style Guide* is not definitive. Other important style guides for Electrical Engineers are the *EPRI Style Guide* (8) and the Department of Defense Style Guide (9).

The material in this manual, along with the previously mentioned style guides, provides a complete guide for writing reports. The reasons for doing this were:

- To provide a solid basis for the development of reports.
- To provide a consistent format so that all publications will be easily recognized, consistent in appearance and of high quality.
- To emphasize the importance of quality in all presentations.

6. WRITTEN REPORTS - ORGANIZATION

This section is concerned with the format for presenting your material. Organization is very important and these particular sections for reports have passed the test of time. Recommendations with respect to further organization of the material in the body of the report will be presented later under specific report types.

Technical content is certainly the most important aspect of your report. However, there are many ways in which the value of the report can be diminished. Previous sections have mentioned the importance of presenting the material in such a way that it does not detract from the overall effectiveness of the communication. The fact that almost every publication group has its own style guide is indicative of the necessity to maintain a consistent quality in its publications and to provide a respected product to its readers.

6.1. Attached Summaries

Attached summaries are tear-off pages attached to the front of the report (before the title page). These summaries will contain most of the material on the title page plus the summary (see Appendix A.1). Of concern in this guide are two special summaries: the Peer Summary and the Executive Summary. These summaries will not be included with documents leaving the company and hence may contain information that is proprietary or inappropriate for public dissemination.

6.1.1. Peer Summary

This summary is for your peers who might be working on a similar project or perhaps an enhancement of your project. Include information regarding the problems you encountered and how to avoid them. Include anything worth passing on that you don't want to put into the report, the Executive Summary or the Abstract.

6.1.2. Executive Summary

The Executive Summary should contain information relevant to the responsibilities and interests of the company executives. Although the report can not disclose proprietary information, the executive summary is not so restricted. It should include not only an abstract

of the report but also all information that your executives need to know. This would include anything concerning a better way to build the device or other techniques that need to be investigated. Any discoveries of value to the company that are not included in the report should be included in the Executive Summary.

6.2. Title Page

The title page carries certain information regarding the report. A sample title page is included in the Appendices directory under Sample Report Sheets.

6.3. Front Material

6.3.1. Abstract

The Abstract is to carry information to readers outside the company (to the world in general) regarding the information contained in the report. It must be brief, concise and professionally written. It should reflect the conclusions and any new or special methods that were used in the project.

6.3.2. Table of Contents

The Table of Contents should be of the same format used for this document. It does not refer to any material that precedes it, or to the List of Figures or List of Tables (which are, in a way, a part of the Table of Contents). Neither will it refer to the Glossary or Acknowledgements if they appear. Begin with the Introduction. The title at the top of the page is "CONTENTS" (not TABLE OF CONTENTS.) Subsections are indented to align with the section name preceding it. This rule continues for subsections of subsections.

6.3.3. List of Figures

The List of Figures follows the Table of Contents on the next page. The page title will be "FIGURES."

6.3.4. List of Tables

The List of Tables follows the Table of Figures (or the Table of Contents if there is no Table of Figures) on the next page. The page title will be "Tables."

6.3.5. Glossary

If a glossary is used, it would appear at this location in the report.

6.3.6. Acknowledgements

If acknowledgements are needed, they should appear here.

6.4. Introduction

The Introduction is intended to convey information to the reader about the contents of the report. It may also contain information as to why the project was undertaken. The writer needs to understand that readers will want to access this information with a minimum amount of effort. Hence, organization is critical. Bullets with short explanatory statements are quick to peruse and appreciated by the reader.

6.5. Body

The contents of the Body will differ substantially depending on the type of report. This aspect is considered for each type of report in Section 7 of this document.

6.6. Conclusion

Readers will focus particularly on the Conclusion. Make your writing succinct and to the point. Words have meanings, so be sure to say exactly what you intend to say. Justify any recommendations that are made for future efforts.

6.7. References

Follow the IEEE guidelines for references. These guidelines are available on the Internet at several locations. See Appendix B.

6.8. Page Numbers

The Table of Contents and all subsequent pages of Front Material are numbered in roman numerals (i, ii, iii, iv,…).

The report itself is numbered in Arabic numbers (1,2,3,…). However, by tradition, the number on the first page is not printed.

All printed page numbers are to be centered at the bottom of the page (with hyphens) as in this document.

6.9. Typical Comments on Graded Reports

The following comments are among those found most frequently on student reports (I have been a teacher).

1. Be more direct.
2. No “fat” words or “fat” writing. Don't use phrases that sound good but don't really contain any substance.
3. Assume that the reader has a reasonable background in the subject matter. Use standard terms but explain any new or unusual aspects.
4. Properly reference all sources from which you have taken special or unique information.
5. Regarding the Introduction: Make sure the reader knows what the rest of the report is going to show. Bullets are very good; they help the reader and they also help you in the organization of your presentation.
6. Regarding the Conclusion: Keep it straightforward.
7. Some people are offended by split infinitives and dangling prepositions. Avoid using these constructs.
8. Using nouns as verbs is similarly offensive to many. If you don't automobile to work and elevator to your office, then don't input your data so the computer can low-pass filter it and output the results. Efficiency may eventually rule, but until then your writing may be considered offensive and of poor style.
9. Use the right word to express exactly what you mean to say.
10. Follow the style guide.

6.10. Suggestions from EPRI

I inlcude these because they are to the point and I agree with them.

SUGGESTIONS FOR WRITING REPORTS
FOR EPRI PUBLICATION AND DISTRIBUTION

In addition to referring to the EPRI Style Guide, the following comments will assist you in producing reports that will be well received by your readers.

1. Write in the third person rather than first person.
2. Be careful about referencing other materials, particularly EPRI Interim Reports, which may not have been printed and, therefore, are not in general circulation. Supply the information if it is required and not readily available.
3. Lists, tables, and figures are excellent methods of presenting materials; use them wherever feasible.
4. Consider incorporating a list of symbols and data forms at the beginning of your report
5. The Abstract and Summary sections should be written for upper level management rather than a group of mathematicians.
6. On multiple author reports, coordinate throughout the production effort.
7. Number each equation even if it is not referenced elsewhere in the text.
8. When defining the variables associated with an equation, indent them so that they stand out. For example:

   V = Z I (EQ 1.1)

   V is the resultant node voltage in volts
   Z is the network elements impedance in ohms
   I is the current in amperes through the network element
9. Have the report reviewed by someone in your organization who is not associated with the project.
10. Include in your report the following items if at all applicable.
    - A description of the problem to be solved.
    - A statement of the assumptions made.
    - The solution techniques investigated and/or employed.
    - The results of your research efforts.
    - A discussion of the application of the results to reduce or eliminate the original problem.
11. All figures and tables should read from the bottom and right edges of the page in the final product.
12. If a computer program is a deliverable, describe the documentation available in accompanying manuals.

7. *WRITTEN REPORTS* – CONSTRUCTING THE BODY

7.1. Laboratory Reports

The Body of a laboratory report will contain the following sections (not all projects contain laboratory work, but the points are well taken to keep you in the right frame of mind):

- **Background and Theory:** Give the reader a brief review of the necessary information to understand the experiment.
- **Design:** Explain and show the design. Calculations go here.
- **Procedure and Implementation:** Describe the steps used in lab. This should be only a brief re-creation of the experiment explaining what was done, *not* a lengthy minute-by-minute account.
- **Results and Discussion:** Provide the reader with the results of the experiment, comparisons with predicted theory, and reasonable explanations of any difficulties or surprising results. Include graphs, tables and figures where appropriate. Include a discussion of the methods and circuits used in the experiment and indicate any measurements or investigations you made. Indicate important observations *you* were able to make that other students might have missed. Include any recommendations that could possibly improve the results.

Before finalizing the report for submission, look over the entire report with a critical eye. Is the report complete and concise? Is the substance of the report good enough *that you would show it to a potential employer* as an example of the quality of work you do? Does it indicate that you know what you are doing? Are the sections labeled? Are the graphs labeled and *interpreted* (slopes, breakpoints, etc. identified)? Are the circuit diagrams accurate and labeled? Do you tend to use imprecise phrases and meaningless platitudes like "very large," "negligible," "this experiment demonstrates," "the results validate the theory," "the measurements are cruddy because ideal conditions do not exist," etc.?

7.2. Project Proposals

Proposals are unique in that they request resources and dedication of manpower to perform the research and development tasks. The proposal must show that extensive thought has been involved, including economic and environmental impact studies. The body of the report should contain the following sections.

- **Background and Theory:** Give the reader a brief review of the necessary**.** information to understand the results of the proposed effort.
- **Proposed Design:** Include any alternate designs with pros and cons. The specifications of the final completed project are essential. These must be discussed with the specifications of existing products that would be considered as competitive.
- **Environmental Impact:** Demonstrate that the consequence of the work has been thoroughly studied with respect to the effect upon the environment not only of the proposed effort but also of the process of manufacturing, distribution and disposal.

- **Expected Cost:** Show the items that will be needed and their expected cost during the period. If a product will result, show the expected manufacturing costs involved, and any costs of disposal that might be required because of environmental impact.
- **Economic Analysis:** Show clearly the economic advantage to the company of pursuing the proposed project. This should include expected return and the impact of marketing.
- **Task Schedule:** Include all the tasks required to guarantee completion of the proposed effort. This is best presented with a PERT chart or Timeline presentation showing the expected starting time and completion of all tasks.

Successful proposal writing requires a certain amount of salesmanship. Make certain that enthusiasm is appropriate and that all positive elements have been put forward. Ethics and honesty, however, require that any negative elements have also been thoroughly studied and presented.

7.3. Progress Reports

Congratulations, your proposal has been accepted and/or is being continued. Now it is necessary to present periodic reports including what experiments have shown, how designed components are functioning, and how the project stands with respect to its planned completion date. It must include any results which will either confirm or endanger meeting of specifications. Any modifications of scheduled tasks must be justified and effects noted in the PERT chart or Timeline. Similarly, any modifications in costs must be shown. Any new material regarding manufacturing, distribution or marketing should be included. The sections of the report become:

- **Progress To Date:** Give the reader a brief review of the accomplishments since the last report.
- **Design:** Show the components which have been designed thus far and the results of testing and the effect on specifications.
- **Environmental Impact:** Include only if new information has been uncovered.
- **Expected Cost:** Show the expected costs even if it remains unchanged. If there have been changes, show and discuss the reasons for the changes.
- **Economic Analysis:** Include only if new information has been uncovered.
- **Task Schedule:** Show the current schedule of tasks. Point out any changes.

7.4. Final Reports

Congratulations, your project has been completed. Now it is necessary to present the final design and the results of the final tests. It is perfectly legitimate to include portions of all the intermediate reports, including the proposal if the information is appropriate for inclusion. The final report parallels the proposal in many ways:

- **Design:** Show the final design**.**
- **Performance:** Show the final performance characteristics. These should be presented in comparison with original expectations.

- **Environmental Impact:** Include a complete statement incorporating everything discovered in the development process.
- **Final Cost:** Show the final cost of the project and any modifications to the expected costs of manufacturing, distribution, marketing and disposal.
- **Economic Analysis:** Show the final economic analysis.

Note that the conclusion must reflect the success of the project in meeting original specifications, statements regarding expected use and the expected economic impact for the company. Impact on the environment should be included.

7.5. Other Scenarios

When you begin your career, it is likely that you will be assigned tasks of investigation or product modification to use new components or to meet new specifications.

In general, the Introduction and Conclusion sections of your reports will be similar to those already discussed in Section 6 and in this section. However, the body should have section names that are appropriate to the task and may differ from those discussed in this guide.

8. ORAL REPORTS

8.1. Guidelines for Oral Reports

8.1.1. Objective

To become proficient at communicating via oral presentations.

Reference

"Presentations That Work"
IEEE Engineers Guide to Business, Vol. 1

Two Major Areas Covered

- Planning the talk and preparing the material\
- Delivery techniques

8.1.2. Planning

Oral Reports are not the same as written reports.
Listeners take in information differently than readers.

Overview

- You have "x" minutes to present your material (don't run over – your violation will effect the opportunities others have to properly present their projects)
- Know your audience and their needs (decide in advance what should be included and what should be left out)
- Follow a structure for the report
- Prepare material that is readily absorbed
- Plan for one major point per transparency
- Set aside time for lots of practice

8.1.3. Structure of the Talk

- **With the Title Sheet**: Introduce yourself, your partners, the project name, venue (EE---), date
- **Project Introduction**: objective, specifications
- **Body**:
  Say up front whether it met specs or not
  Theoretical considerations
  Concept explanation
  Construction (critical elements)
  Measurement techniques
  Results showing it did or did not meet specs
  If specs not met explain why
- **Conclusion and Summary**: Restate major point(s) of talk (no new information)

8.1.4. Developing Content of Talk

- Write single most important point at top of a planning page
- Write other important points at the top of the page

- For each point, write ideas on a separate sheet
- Develop each sheet into a view graph (simplify)
- Keep needs of audience uppermost in mind
- Practice to see if it fits in the allotted time
- Always include Title and Summary sheets

8.1.5. Overhead Viewgraphs

Each transparency should have:

- Only one major point (e.g., title, circuit block diagram, graph, conclusion)
- Plenty of white space (don't crowd)
- Large, bold, simple, clear type – easily readable from the back of the room
- Use bullets and indentation, and varying font size
- Use as few words as possible to convey ideas
- Don't copy paragraphs from written reports onto the viewgraph
- Graphs (e.g., gain vs. frequency) convey information very quickly
- Avoid tables with many rows or columns
- Use minimum of equations

8.1.6. Number of Viewgraphs

- As a rough rule of thumb, you can average one viewgraph per minute
- Practice to determine whether you have too many or too few viewgraphs

8.1.7. Delivery

Here are a few tips:

- Don't read the report! You will lose the audience instantly
- Do practice the presentation, a lot
- Do dress nicely
- Have a transparency for everything you talk about – don't go off onto tangents
- Humor (remark, cartoon) is effective if not distracting or offensive
- Stand so that the entire audience can see the screen
- Face the audience, speak to them, not to the screen
- Make eye contact with individuals around the room
- Speak loudly (enough to be heard over the ambient noise), but don't bellow
- Avoid "verbal static" such as uh, umm, y'know, etc.
- Wind up quickly in the conclusion, don't draw it out.

8.1.8. Summary

- Keep the needs of your audience in mind
- Outline the talk
- Develop one overhead view graph per major point
- Make each transparency readable and understandable
- Practice (a lot) giving the talk

8.2. Another Approach for Effective Delivery

Some people are very good at making presentations. The following presentation, a slightly modified version of a presentation developed by Dale Carnegie Training[1], is provided as a sample Powerpoint presentation. It can help all of us to do our best.

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[1] **http://www.dalecarnegie.com/**

ORAL REPORTS

EE 494 Oral Reports
Don J. Nelson

From Dale Carnegie Training©

Introduction

Introduction

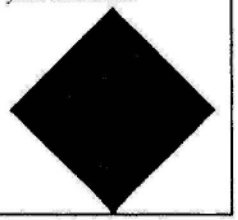
Delivering you presentations effectively involves using a proven four-step process: Plan, Prepare, Practice and Present. Follow these guidelines and you and your message will have high impact on your audiences.

Plan

- Describe Your Audience
  - Knowledge
  - Experience
  - Needs
  - Goals

Plan (Cont'd)

- Define the purpose of your talk based on the outcome you seek with your audience:
  - Inform
  - Persuade
  - Motivate to action
  - Sell
  - Teach
  - Train



Prepare

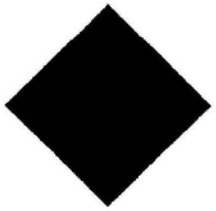
- Establish a positive Mind-Set
  - Value your message.
  - Visualize yourself succeeding.
  - Visualize audience responding.
  - Give yourself pep talks.

Prepare (cont'd)

- Prepare an attention-getting Opening
  - Use a question related to audience need.
  - Pay a sincere compliment.
  - Relate a relevant incident.

Prepare (cont'd)

- Illustrate and support Key Points with evidence and visuals.
  - Statistics
  - Analogies
  - Demonstrations
  - Testimonials
  - Incidents
  - Exhibits



Prepare (cont'd)

- Prepare a memorable Close
  - Dramatize your ideas.
    Throw down a challenge.
  - Use a motivating statement.
  - Restate the key benefit.
  - Deliver a convincing summary.

Practice

- Dale Carnegie Training® has found that the three E's are fundamental to successful presentations.

Practice (cont'd)

- Build your confidence and effectiveness by establishing for yourself
  - Why you have **earned the right** to deliver this talk.
  - Why you are **excited about** the subject.
  - Why you are **eager to share** with your audience.

Practice (cont'd)

- Practice your presentation and review your visuals for
  - Clarity
  - Relevancy
  - Eye-appeal
  - Visibility
  - Quality
  - Memorability

Practice (cont'd)

- Practice your presentation before an audience, coach, video camera. Receive feedback and coaching on
  - Strong opening.
  - Clear key points.
  - Logical flow.
  - Credible evidence.
  - and ...

Also receive feedback and coaching on

- Memorable close.
- Clarity of message.
- Identifying distracting mannerisms.
- Results achieved.

Present

- Assume the attitude of a **PRO** in delivering presentations:
  - **Privilege**
  - **Responsibility**
  - **Opportunity**

Present (cont'd)

- Rely on the fundamentals
  - Own your subject.
  - Feel positive about your talk.
  - Project to your audience the value of your message.

Present (cont'd)

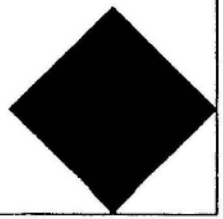
- Make a positive first impression:
  - Establish eye-contact.
  - Display poised, confident body language.
  - Be relaxed.
  - Be well groomed.

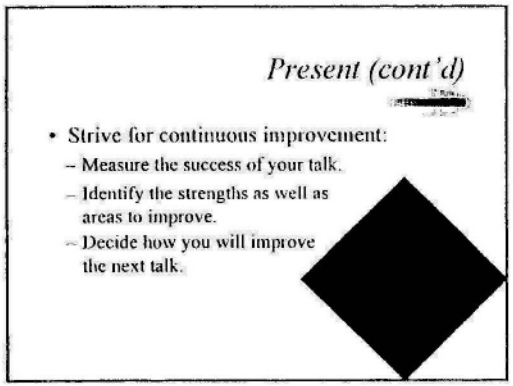
Present (cont'd)

- Build rapport with the audience:
  - Be sincere.
  - Be yourself.
  - Say "we" not "you".
  - Talk in terms of your audience's interest.
  - Involve you audience.

Present (cont'd)

- Hold the attention of the audience:
  - Be enthusiastic.
  - Use vivid words.
  - Express yourself clearly and concisely.
  - Tell a story.
  - Have an upbeat voice.
  - Have proper body animation.




Present (cont'd)
• Strive for continuous improvement:
– Measure the success of your talk.
– Identify the strengths as well as areas to improve.
– Decide how you will improve the next talk.

8.3. Considerations When Evaluating Oral Reports

1. Introduction
   a. Clearly stated the mission and goals.
   b. Clearly explained why the experiment was performed.
   c. Clearly explained the results of experiment.
   d. Clearly pointed out what the body of the talk will contain.

2. Body
   e. Well organized; followed a natural development
   f. Contained sufficient detail so that the audience could understand.
   g. Covered the important points.
   h. Didn't dwell on unimportant aspects.

3. Conclusion
   i. Well-stated (honest, concise, pertinent).
   j. Included cautions/recommendations to others doing the same or similar experiment, if pertinent.
   k. Pointed out other things that need to be investigated, if pertinent.

4. Answers to Questions
   l. Answers were appropriate to questions.
   m. Answers were well-stated.
   n. Answers were given openly and honestly with confidence/poise.

5. Audience Sensitivity
   o. Made eye contact with listeners through the audience.
   p. Maintained a professional appearance at all times.
   q. Flow of information was smooth and comfortable to the attentive listener.
   r. Was courteous and respectful to those asking questions.
   s. Left audience with a feeling of just having seen a quality presentation.

6. Presentation effectiveness
   t. Opening was an attention getter.
   u. Made the subject interesting, even exciting.
   v. Created an aura of expertise and demonstrated confidence.
   w. Appeared confident regarding the results and the quality of work on the project.
   x. Made appropriate (optimal) use of visual aids.
   y. The message was clear.
   z. The closing was memorable.

The overall grade should consider the question "Would you like to have this person represent you or your company in a conference where a major contract is at stake?" It should also reflect the feeling you get (based on this presentation) regarding the quality of the work performed.

9. EVALUATION OF REPORTS AND ORAL PRESENTATIONS

Everyone consciously or unconsciously evaluates the people they meet in their own profession. Undisciplined evaluation can be harmful not only to the person being evaluated, but to the person doing the evaluation. Failures in professional evaluation can be damaging to a company as well.

As a part of your professional growth in this area, you may be asked to evaluate the performance of your peers. At this time, this evaluation will be restricted to their performance in the laboratory as reported in their oral reports and in their oral presentation itself.

Remember that evaluation is always in a "sandwich" environment. While you are evaluating the oral presentations, you will be evaluated with respect to your observations. In a company environment, your ability to observe and evaluate becomes more and more important as your career progresses.

Although we all have a tendency to rate those things that are most important based upon the current "winds," evaluation is always a difficult and "sole searching" task.

Your instructor will place a weighting of importance to each aspect of the report. Generally, your grade will reflect those weightings. However, do not expect that your overall grade will be a computable result of the individual evaluations (unless your instructor chooses to do so). For example, an incorrect technical statement could destroy the credibility of your entire report. Also, extremely poor writing can overshadow the quality of your work and the content of the report.

Example rating sheets for peers and executive evaluations are included in Appendices under Evaluation Reports.

10. REFERENCES

[1] Fowler, H. W., *A Dictionary of Modern English Usage*, Oxford University Press.

[2] W. Strunk, Jr. and E.B.White, *The Elements of Style*, 3rd Ed., MacMillan Publishing Co, Inc., New York, 1979, p. 54.

[3] W. Strunk, Jr. and E.B.White, *The Elements of Style*, p. 1.

[4] W. Strunk, Jr. and E.B.White, *The Elements of Style*, p. 2-7.

[5] Fowler, H. W., *A Dictionary of Modern English Usage*, 566-9.

[6] *The Chicago Manual of Style*, The University of Chicago Press

[7] *IEEE Standards Style Manual*, The Institute of Electrical and Electronics Engineers, Inc. (http://standards.ieee.org/guides/style/index.html).

[8] *EPRI Style Guide*, The Electric Power Research Institute. http://www.epri.com/corporate/discover_epri/epri_facts/reportspecs/styleguide.html

[9] *Format Requirements for Scientific and Technical Reports*, Military Standard MIL-STD-847(Latest Revision), Department of Defense.

12. Recommendations from a burned out professor?

Professor: Unknown

Some of you have noticed a few typos in my e-mails now and then, to improve this I am now using a new set of rules for editing.

1. Verbs HAS to agree with their subjects.
2. Prepositions are not words to end sentences with.
3. And don't start a sentence with a conjunction.
4. It is wrong to ever split an infinitive.
5. Avoid cliches like the plague. (They're old hat)
6. Also, always avoid annoying alliteration.
7. Be more or less specific.
8. Parenthetical remarks (however relevant) are (usually) unnecessary.
9. Also too, never, ever use repetitive redundancies.
10. No sentence fragments.
11. Contractions aren't necessary and shouldn't be used.
12. Foreign words and phrases are not apropos.
13. Do not be redundant; do not use more words than necessary; it's highly superfluous.
14. One should NEVER generalize.
15. Comparisons are as bad as clichés.
16. Eschew ampersands & abbreviations, etc.
17. One-word sentences? Eliminate.
18. Analogies in writing are like feathers on a snake.
19. The passive voice is to be ignored.
20. Eliminate commas, that are, not necessary. Parenthetical words however should be enclosed in commas.
21. Never use a big word when a diminutive one would suffice.
22. Use words correctly, irregardless of how others use them.
23. Understatement is always the absolute best way to put forth earth shaking ideas.
24. Eliminate quotations. As Ralph Waldo Emerson said, "I hate quotations. Tell me what *you* know."
25. If you've heard it once, you've heard it a thousand times: Resist hyperbole; not one writer in a million can use it correctly.
26. Puns are for children, not groan readers.
27. Go around the barn at high noon to avoid colloquialisms.
28. Even IF a mixed metaphor sings, it should be derailed.
29. Who needs rhetorical questions?
30. Exaggeration is a billion times worse than understatement.
31. And the last one - Proofread carefully to see if you any words out.