

Remark: In this lecture we begin to encourage students to pay more attention to their writing than before. Many of them are under the illusion that in their jobs they are only responsible for the technical accuracy and somehow someone else is writing the documentation. To educate engineering students to write is an enviable task.

Introduction

In this lecture we go over a few items, which were noted in your submitted reports, in order to clarify some of the essentials of technical writing and elements of style. One lecture is not enough to go over everyone's paper, but the following samples are indicative of the issues that we must be concerned with. In lecture five, we *pointed* out (why past tense, and when can we use present tense?) how difficult it is to compartmentalize one's thought and give proper steps to break a presentation or writing into segments, but we need to start somewhere and this place is a good beginning. Before we close this section, let us answer the preceding question. If we are referring to the *event* of presenting lecture five, *per se*, then we use past tense, because there is an element of time involved here, which was two lectures ago. But if we are referring to the *location* of a piece of information, which is now in a place called "Lecture Note Five," then we use present tense, because these notes are written completely and are available in front of us. Just as any textbook, which is written in certain order and as far as we are concerned we only want to know where a piece of information can be located. Therefore, please ***no more we will or we did explain!*** Section number and all those addresses in a document are for locating information. This explanation is due Professor T.J. Higgins.

Technical Writing – Phase I

Good writing begins with extensive reading. One cannot elucidate clearly if he/she does not read regularly literature, or technical papers in this case. Even experienced writers go through several iterations before putting out their final work, which often, and before the ink is dried, they wish they had used different words or different sentences. Therefore, be prepared to spend a major part of your time on writing and related documentation of your project. In many universities, there are writing laboratories, which help students to improve their skills, but we are pressed for time. There are several other ways that you can get help. However, be aware that some of these helps may actually handicap you, unless you are selective in your choices and insert your own inputs into the final draft of whatever document you are preparing.

Nowadays, for instance, most personal computers come with scores of designed forms and letters that all you need to do is to fill the blank and use these forms to communicate. But that writing does not reflect your own individuality and uniqueness. Your voice does not appear in these forms. Just imagine, you receive 100 resumes to review and all applicants have used the same format to express themselves, among many readily available. On the other hand, if only a handful of these applicants have used their own initiatives and/or have prepared their resume differently, then that small group will stand out in the crowd. That is the way we human being are programmed to react. We are sensitive to identifying these differences very quickly. Here, we are not trying to discourage you from using special forms available in your computers for some of your writing, but rather we are suggesting that be aware of some handicaps that may result when

extensively and solely relying on pre-packaged forms in your computer. Remember that these forms are available to everyone. There are of course, many other capabilities in your computers, which enhance your writing and it would be a grave mistake not to benefit from that. For instance,

spell checking, which is readily available in most computers. It would be totally unacceptable to submit a paper with even one misspelled word. It would be considered an insult to do that! In some sophisticated computers there are also ways to check

grammar, but there again you must be careful not to become a slave to someone else's style. Be particularly careful about using words with

right sound, but wrong meaning. For example, "the computer is done," versus "the computer is down." Be particularly concerned about words with

multiple meanings. Avoid using such words altogether if you can, but if you cannot, make every effort to explain your intended meaning. Pay particular attention to

redundant words and phrases. You cannot detect these imperfections in your own writing no matter how hard you try. That is why it is absolutely necessary for you to let someone else read your report. In fact, we suggest that you exchange proof reading tasks among your peers as a service to each other. Make sure that all sentences are

complete, and not dangling. Having said all the above, we now go back to the main premise of this note. Suppose, we know all the above, then how do we write a technical paper? The fundamental answer is we must first divide the work, which we are trying to write about, into several segments, and pedagogically connect those segments together as follows.

There is always a beginning to the work, and there is an end, and there are segments connecting these two. Each segment should be in at least one paragraph, or a section consisting of several paragraphs. It is always required to number each segment in any technical writing. Furthermore, if a segment is divided into smaller portions, then each portion has its own heading, which normally is under the main heading of that segment. For instance, the "Introduction," of a report is its Section 1, and is shown as:

1. Introduction.

If this segment (note that we still are in the same paragraph, and the reason that we have indented the above line is for the sake of demonstration) has other main elements such as the problem statement, *per se*, then that becomes its Section 1.1, 1.2, *etc.* (Note that we use a double-dot here. One dot for the last word, *etc.*, and the other dot for the end of the sentence, but in many contemporary style only one dot is used.) Thus, we have as, an example,

1.1. Problem Statement. (Note that we also use 1 dot 1 dot.)

In some cases those portions or sub-sections are labeled by A, B, *etc.* In some cases no dot is used at the end of the section heading – many put the dot as shown above.

It is always easier to read a report if it has been coherently sub-divided into sections, each has its own element and/or contribution to the overall body of the report. Each report closes with some concluding remarks or conclusion, where an assessment of the accomplishment or the lack of it, as set out in the introduction, is made by the author. Here, the author may also state his/her future goals based on these accomplishments thus far.

All references must be collected and numbered in alphabetic order (that is our preference and we will elaborate on that in class) at the end of the report. Please use our citation style for reporting these references. Using footnotes are allowed throughout the report, but be aware that these can become very distracting and should be avoided as much as possible. In any event, when using footnotes, number them sequentially throughout the report for possible future reference.

Going back to our earlier comments in this course, when all are said and done, more than 90% of our writing task is about how successfully we can break the actual work or experiment into identifiable segments, or pieces. This segmentation is used in order to describe the process of putting back this construction together in a step by step process. Then writing about this experience is a matter of explaining how each segment is defined and what is its main function.

These comments are just the tip of the iceberg, and we have so much more to talk about, but we hope to go over more of this type discussion in our future lectures.

Finally, you may wonder how can someone become a very good technical writer? Considering that English is not the native language of most engineers or engineering students. The short answer is technical writing for a task that is compartmentalized has very little to do with English, *per se*, and can be managed by every engineer. But the final answer on how to become a good technical writer is three words, practice, practice, practice!

Final Thought

The single most important thing that you must remember about good technical writing is **consistency**. There is nothing more distracting and noticeable about a poor writing than its inconsistency.

Closure

The class ends with reading some more samples of written work of students and instructor as well as other related matters.

Essential thoughts in this lecture

Issues.	Applicability to your project, if any.
Steps to prepare a technical writing.	Obvious!
Do you want to add anything else?	Please elaborate.

Question: Can you show us one sentence with all different tenses?

Answer: Last summer, I **studied** [past event] this topic and **found** [past event] scores of authoritative articles, which some **have been read** [present event], but many **will be scrutinized** [future event] next summer, meanwhile, my research on this matter to date **is reported** [location, always present] in Section 3.1.