Guidelines for writing the six monthly reports

The purpose of the six month reports is to get you used to writing in a scientific style such that when you sit down after three and a half years registration you do not sit in front of a blank piece of paper or a blank computer screen. Hence the reports are supposed to help you build up a body of work that can be included in your thesis and make your life substantially easier. Trust me, a bit of occasional pain now is better than a load of hurt later on. Some of you may well be expected by your companies to produce more regular reports for them. It is perfectly acceptable to submit several of these reports together with a covering few pages explaining the background and directing the reader to the important results. I don't want you constantly writing reports at the expense of the experimental work.

The report will be assessed rather than examined and the feedback you receive will help you develop your work. However if the report is not of the required standard a recommendation may be made that you should not continue with the programme. Each report should be structured so it is easily read and understood by a non specialist Chemical Engineer.

There is no absolute minimum and maximum lengths of your report, if you find yourself writing a fantastic and relevant literature review then I don't want to stop the creative juices flowing, but a report should be in the order of 25 - 30 pages. It might all be theory or it might all be results and discussion, the point is we want you to write something and get into the habit of writing.

The report should be proof read by your industrial supervisor prior to submission so please allow him / her sufficient time to read anything well before the University deadline. Your academic supervisor will not be impressed by correcting English all the time he / she will really want to concentrate the science and your results. The report will be read by your academic supervisor and the EngD programme manager **only**, both of which will have signed confidentiality agreements with your sponsors, but please check beforehand. Reports will be held in the EngD Managers office until graduation when they will be shredded. Feedback will be given in detail by the academic supervisor, whilst the EngD Manager may just skim read the report to make sure on your progress.

Each report should have the following structure. The length of each section may vary depending on how long you have been registered on the programme. Hence a first report may contain a literature review and some theory whereas the fifth and six reports may well contain mostly results.

Abstract / summary.

A one page summary at the maximum outlining the reasons for the work, the major objectives of the report, techniques used, the most important results and conclusions drawn. Note that this will be used as an abstract for the Annual Conference in the Spring. This ironically is normally the last thing you write and should be similar to the conclusions (but not exactly the same.) The abstract is supposed to encourage the reader to read the rest of the report.

Introduction

An outline of why the problem is interesting scientifically with clear objectives for your project and what will be covered in this report. Additionally as you are registered for an EngD the business context of the project should be clearly explained i.e. why this project is important to your sponsor.

Literature review

A *critical* analysis of what other researchers have found when they examined this area. You might be the first person to work in this area, but more often than not someone else will have published something in the area and you need to analyse their papers and comment on what they found. Did they make a fundamental mistake, did they disregard an important parameter, are their assumptions valid, how does their work compare to others? It should not just read as a dry list of papers you have read over the last six months. A really good literature survey should summarise what each paper tells you in relation to the project's objectives and why it is important. If a paper doesn't help you meet your objectives then you probably don't need to quote the paper. Don't be afraid to point out possible improvements or short fallings in a paper, this shows that you have really thought about the problem! A good literature survey is vital so that you do not reinvent the wheel and helps you plan more effective experiments. It should also be an on going process over the years and should grow to be the most up to date review of the area and therefore highly publishable. Remember some papers can not be printed off directly from the various websites, get down the library and photocopy those papers from before the 1990's !

Experimental

There should be sufficient experimental detail for some one else to reproduce your work and compare results, so list the exact name of the equipment used, Chemical Suppliers, procedures used, etc. If you are following a standard procedure then a reference is sufficient.

Theory

This section should contain any background material that is required to understand the results and will probably form the basis of the discussion. However if it is well known standard theory then just reference the standard texts or place in an Appendix.

Results and Discussion

You don't have to present every data set you have ever obtained perhaps just a representative one if they are all similar and place the rest in an Appendix. However your report should contain the most important data sets that allow you to discuss / interpret the results in light of current theory and your objectives. Highlight the important features and any limitations, Careful discussion of the errors and quoting parameters to an appropriate number of significant figures is essential.

Figures

Label the axes and insert SI units. Keep the font style and size the same, so that if you cut and paste the Fig into another document it can still be read, so size 12 to 14 and comparable with the font size in the main body of text.

Axes and lines on graphs should be of a similar thickness and sufficiently bold to reproduce on photocopying. Avoid using shading and pale colours as they might be difficult to read clearly.

Consider the scale of the Figures. Don't have all you data squashed into one corner, play around with the axes so that the data set covers the whole Figure. Would a log scale help ?

Ensure each data set uses a different symbol and ensure that there is a clear legend explaining each symbol. Be consistent across your Figs, for example if one data set is taken at pH 4 allocate that data set the same symbol *every time*, so that the reader can easily pick out that data set in different Figures. Ensure the size of your symbol is large enough as again it might become too small on reduction.

Every Figure / Table should have a legend and Figure / Table number. The legend should be understandable without reference to the text, and should not include material that is not in the text.

Conclusions

Reiterate the important points of the work so far and relate them to your objectives. This should be a short snappy section and will help you write the abstract. No new information should be included at this point. All the conclusions should be supported by the evidence presented in the Results section.

Future work

Include a work plan for at least the next six months either as a Gantt chart or a list of bullet points and the time required to carry them out.

References

It is worth getting your referencing right at the very beginning as in three and a half years you will accumulate hundreds of papers and it is very easy to waste time hunting down the exact page numbers. Devise your own physical system for handling papers e.g. box files or folders sorted by subject area or if you have access to a filing cabinet. There are also various software packages that allow you to keep track. Decide early on how you are going to do your referencing. I find the easiest way is author name and year rather than superscripted numbering, for example, Greenwood et al (1999) reported that …. rather then Greenwood et al [1] reported that …

The former has the advantage of if you move sections around later on you don't have to change your referencing system whereas with the later you have to go through your report changing all the numbers. Most reference software will do this automatically,

but not everyone has it / can afford it. Different journals use different referencing systems just look at some papers to find out, but they will always include all the author's names and initials, the journal name, the volume, the page numbers and the year. Sometimes the title of the paper is included. Books should also include the editor's name, Publisher and ISBN number. In short sufficient information should be listed so that someone else can find the exact same article you have read.

Appendices

These contain additional information / results, which are not important to the story being told in the report but are useful in understanding the work.

Finally the whole presentation

The whole report should look professional, so produce a cover sheet indicating who wrote the report, what the report is about, what stage it represents i.e. six month, two year and who can read it. Include the company and University logo's and ensure the words confidential are plastered across the front. You may well want to include another page for your industrial supervisor to sign that she/ he has read it. Finally get four copies ring bound or the equivalent, keep one yourself, one for your industrial supervisor and send the remaining two to the Programme Manager. E mail copies are acceptable only if the hard copies follow in the post, otherwise I spend a lot of my time and paper printing out multiple copies.

Finally don't forget to include some sign posting in your report. Guide the reader with what is coming next so at the start of each section outline what you are going to talk about and at the end of each section summarise what you have learnt. Cross reference the various sections. If there is something in an Appendix direct the reader there and let him/her decide if that is important. Always clearly state which Figure or Table you are referring to and make sure it is close to the text, it is annoying to go flicking through several pages to find the relevant Fig.

RWG   Jan 2006