Designing Written Reports

Lecture for Senior Design Classes

by

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Overview

- **Purpose and audience** for report or proposal
- Structures contain some elements of both *reports* (*PDRs & CDRs*)
- Parts of the formal proposal document
- “Best Paper” competition
Hats: Engineer, Writer & Presenter

- To perform your professional engineering duties: one mindset
- To communicate your results: a different mindset
- Think of it as two different hats you wear
Purposes for Reports or Proposals

- Why are you writing or presenting this information?
  - Demonstrate oral and written communication skills (ABET)
  - Demonstrate engineering solutions to clients (Workplace)
  - Demonstrate competence to managers (and instructors)
  - Explain to general public.
Audiences for 487-488 Proposals

Who is in your audience?

- Your client (#1)
- Tech advisors
- Project manager
  - In job setting, would review prior to presenting to client
- Other faculty and students

Create an audience analysis chart to keep all in mind
Your Preliminary Design Review

- Has some elements of persuasion, but must demonstrate engineering competence objectively
  - On the job, would have competitors for the contract
- Presents the problem clearly
  - Confirms understanding of client’s problem, with any constraints or parameters
- Presents real design alternatives, defends choice
  - Feasibility and merit criteria related to problem, not just to technical possibilities
- Gives timetable, resources, ways to measure success
- Asks for permission to build and test
Parts of a PDR

- **Front matter** — complete this part last!
  - Title page
  - Executive summary (gives away the contents)
  - Acknowledgments (thanks to those who assisted—optional, but courteous to do)
  - Table of contents with page numbers
  - List of figures, tables, symbols, illustrations
  - Glossary (or nomenclature) if needed, (usually it is)
Executive Summary

- Give special attention to this brief section (1 page maximum length)
  - Read first by everyone
  - Only item read by busy executives, clients
  - Wide range of audience
    - Technical, Managerial, General Public Audience

- Must succinctly describe the problem, solution, evaluation, and conclusion.
Parts of a PDR

- **Body of report/proposal**
  - **Introduction**—the subject, purpose, any background needed, scope, forecast of the report’s structure and conclusions (include patents and articles relating to your problem and design)
  - **Project Description**
    - **Goal**—what will define success (not a solution...that is not a specific built and tested solution)
  - **Design Specifications**
Parts of a PDR

- **Feasibility Criteria**
  - Yes/no constraints
  - What are the critical attributes of the design to be of value

- **Merit Criteria and/or Selection Basis**
  - What are the important desired attributes of the design
  - Measures that will be used to judge success
  - Weighted for sensitivity

- **Work Accomplished in Design**—engineering credibility
  - Reveal your designs
  - Detail your engineering performed in the design
  - Engineering sketches, drawings, discussion, engineering analysis to predict performance of preliminary designs in relation to specifications
Parts of a PDR

- Conclusions
  - Select and defend best design alternative
  - Present budget of projected prototype costs

- Recommendations
  - Your proposal to implement building and testing—detailed drawings
  - Show timeline (project schedule going forward)
  - Request for permission to proceed

- References, bibliography—give credit due, build credibility for your research
Parts of a PDR

- **Appendices and Annexes**
  - Supporting or additional materials not essential to the main body of the report
    - Calculations, working drawings, extended analyses, lists, photos, etc.
  - Resumes of the team, targeting competence to solve the problem
    - Professionally focused, not “student” focus
Differences in Critical Design Reviews vs. PDR

- Not just a repeat of the PDR
  - Very *brief* review of problem, choice of solution—recap what was agreed upon in PDR (No merit, design alternatives)

- Strong emphasis on what you did, why, and with what results
  - Chronology of actions, especially any changes
    - Document with change requests, explain any problems
  - Explanation of test results (tests should be related to feasibility and merit criteria; complete test plan)
  - Request approval to go into production (in real world, $$$$$)
Differences in Proposal for Critical Design Reviews

- Changes in Project Goal for CDR: focus on what has resulted from your original design, construction, and testing; degree of success achieved; state why

- Changes in Recommendations for CDR: discuss future actions as prototype enters production
In Summary

- Assemble a professional document for proposal submission
  - Use good descriptive headings, dividers
  - Edit carefully; get peer reviews
  - Design an effective presentation format
  - Be sure your writer’s tasks are done as well as your engineer’s tasks
“Best Paper” Competition

- Honor awarded to best CDR paper of the year, fall and spring
  - Nominated by EGR faculty (5-10 teams)
  - Evaluated by TCO and STC judges
  - Sponsored by Mercer Chapter STC & TCO Dept.
  - Perpetual plaque to be hung in the building

- Attributes:
  - Clarity of technical information
  - Document design, including integrated visuals
  - Skill in writing (organization, voice, grammar)
Questions?

- Any concerns, concepts I did not cover well?