



Writing Engineering Reports

Purdue Writing Lab



Overview

- **This presentation will cover:**
 - Report purpose and planning
 - Report format and organization
 - Headings and language
 - Visual design
 - Source documentation
 - Finishing touches

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Report Purpose

- **Describe research**
 - Explain problem or issue studied
 - Discuss research method
 - Describe data collected
 - Describe research findings
 - Explain implications

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Report Purpose

- **Inform readers of research results precisely, concisely, and specifically**
 - They shouldn't have to read whole report to get essential points

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Report Planning

- **Before writing, consider:**

- Why you are writing
- What you hope to achieve
- Who you are writing for

These considerations will determine your report's content, organization, textual and visual design

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Report Format and Organization

- **Reports generally include these sections in this order:**

- Abstract
- Introduction
- Literature Review
- Methodology
- Results
- Discussion
- Conclusion

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Report Format and Organization

- **But be aware that order is flexible in that sections can be combined**
 - Some journals combine introduction and literature review
 - Others have the results and discussion combined

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Report Format and Organization

- **Abstract**
 - *Always* comes first
 - Microcosm of entire paper – contains key info from each section
 - Contains essential information *only* – it is brief!
 - Covers research highlights
 - Gives the research problem and/or main objective of the research
 - Indicates the methodology used
 - Presents the main findings and conclusions

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Report Format and Organization

• **Abstract Example:**

A nonlinear finite element procedure for the pre- and postbuckling analysis of thin-walled box-section beam-columns is presented. The influence of local plate buckling upon the overall ultimate buckling behavior of the member is incorporated in the analysis by adopting a set of modified-stress – versus – strain curves for axially loaded plates. Factors such as residual stresses, associated with hot-rolled and cold-formed sections, and initial geometrical imperfections are Accounted for in the analysis. A number of examples are presented to demonstrate the accuracy and efficiency of the method.

From "Elasto-Plastic Analysis of Box-Beam-Columns Including Local Buckling Effects" in *Journal of Structural Engineering*.

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Report Format and Organization

• **Background/Introduction**

- Explains the research problem and its context
 - Explains importance of the problem (Why does it matter? Why is more information needed?)
 - Explains reason and goals for study
 - Explains the limitations of the research performed

You want your reader to fully understand the
significance of your research

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Report Format and Organization

- **Literature Review**

- Summarizes and *evaluates* the literature that you have used in your study by considering:
 - How that literature has contributed to your area of research
 - The strengths and weaknesses of previous studies How that literature informs your own research and understanding of the research problem

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Report Format and Organization

- **Methodology**

- Explains how data was gathered/generated
- Explains how data was analyzed
- Assumes reader understands material
 - Does not include explanatory material
- Is in *past tense* and *passive voice*
 - “A 1” piece of coil was cut”
 - The research has been carried out
 - It is the research, and not your activities, that are of interest

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Report Format and Organization

- **Results**

- Visually *and* textually represents research findings
 - Visual representation of results:
 - Graphs, tables, diagrams, charts
 - Explanatory text:
 - Text points out the most significant portions of research findings
 - Indicates key trends or relationships
 - Highlights expected and/or unexpected findings

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Report Format and Organization

- **Discussion**

- Assesses and comments on research results
- Includes:
 - Explanation for Results
 - Comments on unexpected results, offering hypothesis for them
 - Comparison to literature
 - Does your research confirm previous studies? Deviate from them?
 - Explanation for how info can be applied in broader context

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Report Format and Organization

- **Summary**

- Discusses:

- What was learned through research
 - What remains to be learned
 - Weaknesses and shortcomings of study
 - Strengths of study
 - Possible applications of study (how it can be used)
 - Recommendations

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Organizational Considerations

- **Your audience, purpose, and contents should influence your report organization and format**

- Example: your professor may have very specific guidelines

- **Carefully consider your decisions**

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Headings and Subheadings

- **Headings and subheadings guide readers' attention**
- **Can be used to keep track of various parts of project:**
 - For example: "Making Components," "Assembling Components," and "Testing Assembly"
- **They should be:**
 - Specific and helpful
 - Used to break up text and "chunk" information
 - Used to guide readers' attention

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Headings and Subheadings

- **Example of vague heading:**
 - "The use of some computing technologies in certain engineering classrooms"
- **Example of specific heading:**
 - "Using Matlab in the Freshman engineering classroom"

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Language and Vocabulary

- **Reports should be easily accessible**
 - Be straightforward and concise
 - Use simple terms, not jargon and technical terms
 - Keep sentences short and simple (20 words max)
 - Be specific and not general
 - Use concrete numbers and metaphors or similes

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Visual Design

- **A report's visual design can make or break its communication success**
- **Visual Design includes:**
 - Use of graphs and other graphics
 - Use of white space

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Visual Design

- **Graphics:**

- Should be used to illustrate specific points
- Should be incorporated in a way that is natural to report's content/context
- Should be explained fully in text using references such as "Fig. 1 shows..."
- Should be cited if taken from a source

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Visual Design

- **Graphics – a caveat**

- Graphics *do not* speak for themselves!
- For this reason, textual information should come *before* graphics.

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Visual Design

- **General layout should focus readers on key information**
 - Use white space to guide readers' attention
 - Created through use of headings, subheadings, and visuals

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Source Documentation

- **Cite sources whenever you are quoting, paraphrasing, or summarizing work that is not your own**
 - Quoting directly is discouraged
- Sources include:
 - Books
 - Journal, magazine, or newspaper articles
 - Interviews
 - Conference Proceedings
 - Lectures

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Source Documentation

- **Citing:**
 - Shows your credibility as a researcher
 - Gives proper credit to authors and researchers
 - Protects you from accusations of plagiarism

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Source Documentation

- Use APA or other specified format for documentation
- Check online for style guides
 - <http://owl.english.purdue.edu>
 - <http://www.apastyle.org/>
- Check journals for format info

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Finishing Touches

- Usability Testing
 - Have a colleague read your report for clarity, organization, and visual design
- Check your sources for proper citations
- Proofread carefully – or better yet, ask someone to do it for you

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Report Writing

End



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