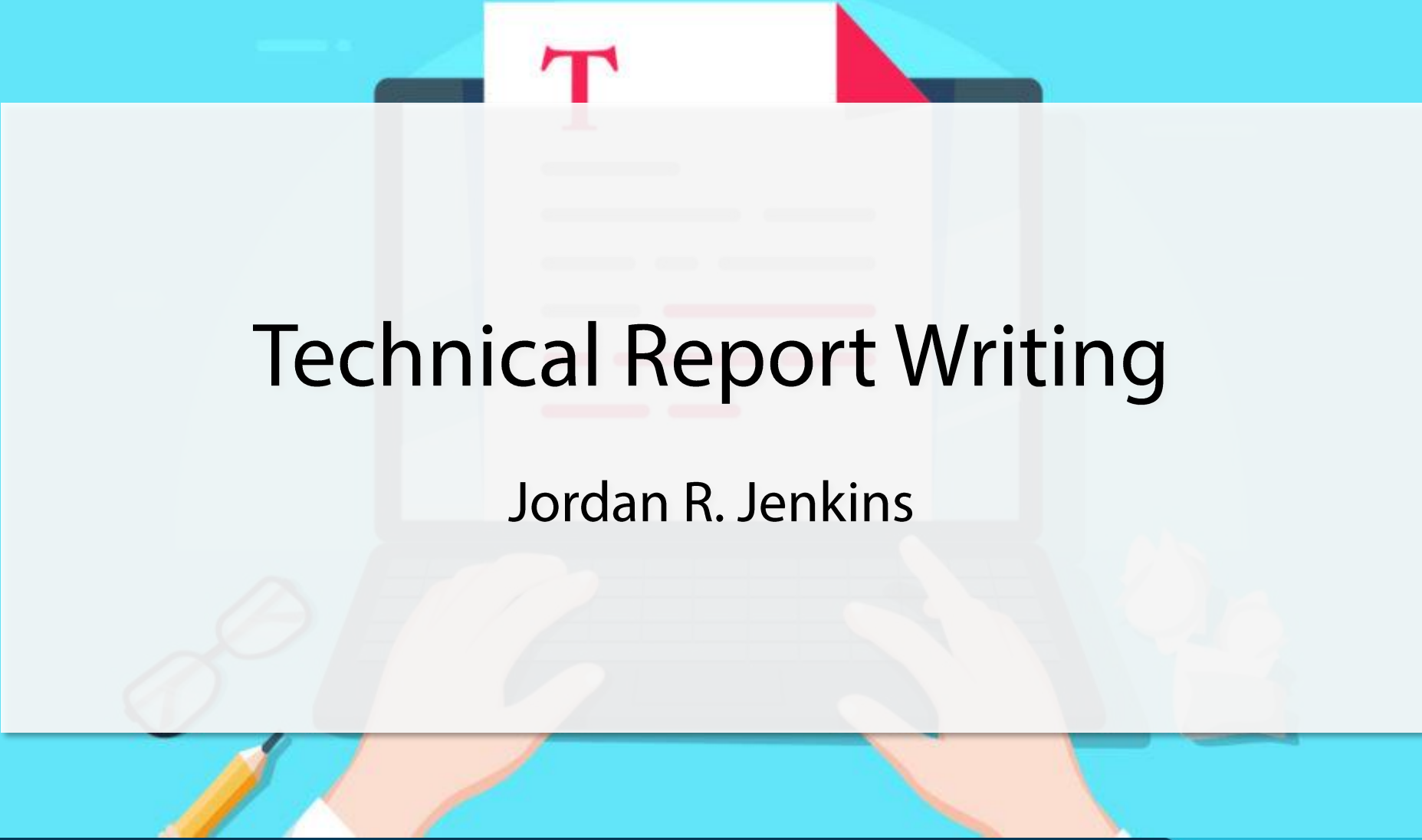




Technical Report Writing

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Today's Lecture – Technical Reports

Introduction to Technical Reports

- What is a Technical Report
- Why they are Important to your Studies
 - Industrial Relevance
 - Considerations before Starting

How to Construct a Technical Report

- Writing Style
- Report Format
- What each Section should Contain
 - Report Presentation
- Using Illustrations to Support your Work

Introduction

What is a technical report?

- A specialised style of writing to suit a technical audience. Technical reports should be easy to read and impart the information contained within to the reader easily.
- Emphasis of a technical report should be on the information and technical content. A technical report is not meant to 'entertain' the reader, it is meant to inform them!
- Be clear enough that readers from a range of backgrounds will be able to understand the important sections.
- Technical reports should be concise, highlighting the important information.

Technical Reports – Why are they Important?

In Industry

Engineering/manufacturing activity relies heavily on technical reports:

Design Specifications

Investigative Reports

Failure/Risk Analysis

Updates & Revisions

- Basis of good decision making in business
- Used to communicate technical aspects to both internal personnel and customers
- Technical people prefer to read concise, technical documents

Technical Reports – Why are they Important?

In Education

An excellent practice to perfect your writing style (in engineering)

Assignment Reports

Technical Posters

Technical Presentations

Major Project Report

- Good way of conveying your understanding of a subject to staff
- Lets you keep records of the work you have done
- The process of writing and researching helps you learn

Starting out – Things to Consider

Know Your Audience!

- Who is it for?
- What does the reader already know about the subject?
- Why do they need this report?
- What information do you need to convey to them?
- What response are you expecting to the report?
- What do you need to include to ensure this response?

Read the Brief!

- Don't miss out on marks by missing information or misunderstanding the aims.
- Scrutinise the marking scheme.

Starting out – Things to Consider

Who is it for?

Academic Report – Lecturer

- What sort of information must you include to meet learning outcomes? (ticking the boxes)
- Academic Rigor (correct formatting, appropriate use of literature, sound referencing, spelling & grammar).
- Lots of background context/scene setting – Aims to add to the wider “body of knowledge”
- Questions addressed tend to be more conceptual/theoretical.

Industry Report – Fellow Engineers/Management

- Conveying information in an effective/efficient manner (cold hard facts/bottom line etc.)
- Less concerned with ‘ticking boxes’.
- Typically used to find & document solutions to problems/issues.
- Problems addressed tend to be more practical/applied.

Starting out – Things to Consider

Why does the person need the report?

Academic Setting

- To assess your level of understanding and award marks
- Opportunity for you to demonstrate knowledge

Industrial Setting

- What is the key information they asked you for?
- Make sure the answers to these questions stand out!

Starting out – Things to Consider

What information do you REALLY need to convey?

- Values & Figures or Conceptual?
- Are you just reporting back results?
- Does the context need explaining?
- Does the reader need background information?
- How concise can you make it?

Remember: although academic reports are typically more conceptual/theoretical, you should still avoid being needlessly verbose. Aim to convey information completely, but in a concise manner (avoid the waffle!).

Starting out – Before Writing

Make a Plan

- Write down the aims and objectives of the assignment.
- Make a note of any specific things the brief asks for.
- Has the lecturer mentioned things in lectures? Write them down!

Once written, compare your report to these notes
Does your report meet all the points you noted down?

Starting out – Prioritising Research

...Gather material/research for the report

- Separate into 3 categories:

1. Obviously important material which *must* go into the report as it is completely relevant to objectives
2. Borderline information – useful as background or relevant to some readers, might amplify some material from category (1)
3. Information which is interesting (or not) but not relevant to the objectives of the report

Report Formatting – Writing Style

A very important aspect of writing a technical report is that it should be written in the 3rd person.

'I' and 'We' have no place in a technical report.

Should always be past tense.

Example:

1st Person: 'I can see the results show...'

3rd Person: 'The results indicated that....'

If you are suggesting future research, then future tense can be used.

Report Formatting – Writing Style

- Using a formal and professional writing style
- Adds to the quality of a report.
- Try not to use colloquialisms & common abbreviations.
- Give thought to your sentences, can you use different wording so that it reads better?

Instead of: 'We put the tool in the machine spindle...'

Use: 'The tool was installed in the machine spindle...'

Be careful here, trying to be 'too fancy' can make a report sound worse than if it had been left more simplistic! Remember Engineering, not English Literature!

Report Formatting – Document Structure

- Every report needs a strong beginning (introduction) and end (conclusion)!
 - A good introduction should identify your topic, provide essential context, and indicate your particular focus in the report (aims & objectives). Aim to engage your readers' interest here!
 - A strong conclusion will provide a sense of closure to the report while again placing your concepts in a somewhat wider context.
 - You don't have to write the first sections first!
 - Consider how much background information is required.
1. Concise reports are easier to read
 2. Keep your report as short as possible – Don't waffle!
 3. Leverage psychology – studies show that lecturers are mostly influenced by the quality of your introduction and conclusion when marking.

A technical report should include the following sections:

Sections in red would be optional, depending on the individual report requirements.

1. Title Page
2. *Abstract*
3. Contents Page
4. Introduction
5. Literature Review
6. Methodology
7. *Separate Results Section*
8. *Separate Analysis Section*
9. Combined Results & Analysis / Discussion
10. Conclusions
11. *Evaluation / Recommended Further Works*
12. References
13. *Appendices*

Report Formatting – Document Structure

Break up the report – Make it easier to read

- Use sections and sub-sections to split up the work
- Major sections should **ALWAYS** start on a new page.
- Make sure your section headings are clearly identifiable!

1. Main Heading

1.1 Sub-Section Heading

1.1.1 Sub-section within Sub-section heading

University of Wales Trinity Saint David
Wales Institute of Science & Art

 Prifysgol Cymru
Y Drindod Dewi Sant
University of Wales
Trinity Saint David

Title of Report Here

Module Name/(Module Code)

Your Name
Your Student ID Number
September 2020

Report Formatting – What to Include

Title Page:

University of Wales Trinity Saint David

Wales Institute of Science & Art

Report name

Module name & code

Student name

Student ID number

Date (mm/yyyy).

Report Formatting – What to Include

Abstract:

A brief overview of the report (250-300 words) that tells a reader what was investigated, how it was done and the main findings. Write this at the very end once the rest of the report is done.

Contents Page:

- Full table of all headings and sub-headings and corresponding page numbers.
- Word has an easy-to-use function for this.
- Also include lists of figures, tables and equations here if required.

Report Formatting – What to Include

Introduction:

- Where you lay out what the intent of the report is.
- Describe what you are investigating and what the end goal is (aims & objectives).
- This can be one of the shortest sections of a report but is one of the most important!

Example:

The purpose of this report is to analyse, using statistical modelling, the tensile loading placed upon end-of-arm tooling during the operation of an industrial robot. Specifically, the report will focus on the Mitsubishi RV-2AJ industrial robot. The intent of the report is to analyse how tensile force is affected when altering certain variables, such as component mass and joint speed/acceleration. In doing so it will be possible to compare how the performance of the tooling, in its standard configuration, will compare to that of a parametrically optimised version.

Report Formatting – What to Include

Literature Review:

- This is where you present the knowledge you have gained from your research.
- Gives the reader some background and context relating to your report.
- Referencing is key here!
- Use this section to 'set the scene'.

Methodologies:

- Explain the procedures you used to complete the investigation.
- Should not be an absolute step-by-step procedure.
- There still needs to be sufficient detail for someone to understand and fully replicate your experiments.

Report Formatting – What to Include

Results & Analysis/Discussion:

- Where you present the results you have found, using graphs & table - make sure it is displayed clearly and easy to read!
- A discussion and analysis of the results come here. Explain what the results show and what your findings are, how do they compare to other papers?

Conclusions:

- This section should be relatively concise and discuss what your work means in a broader sense.
- Focusing on summarising the main points and important findings from the analysis section.
- Tie up and finish the report

Report Formatting – What to Include

Evaluation:

- What could have been done better in the testing, were there issues with the testing/results collection?
- Recommendations for how the process could be improved in the future.

References:

List of referenced works (more on this later)

Appendices: Often overlooked, but very important!

This is where you can put information that is not needed by most readers, but is still relevant:

- Tables of raw data
- Detailed Calculations
- Sections of text that are relevant but don't fit in the main text

Specific SoE Formatting Requirements

Font: Use clear, easy-to-read fonts like Times New Roman, Calibri or Arial. Size 11.

Line Spacing: Use 1.5 line spacing unless specified otherwise.

Margins: 2.54cm all around (Word's default)

Page Numbers: Bottom of page. Should start after the title and contents pages.

Headings: Main section heading & sub-sections are numbered. Use the MS Word 'Styles' feature, and then creating the contents page is easier

Report Formatting – Easy Marks/Mistakes

Punctuation

- Punctuation makes all the difference!
- Your work will read much better with good use of punctuation
- Plenty of online resources for correct punctuation rules

Paragraphs

- Break up large blocks of text where appropriate
- Long blocks of text are difficult to read
- Each paragraph should have a consistent subject

Sentences

- Short sentences will convey information better
- Sometimes longer sentences can be useful, making the reader dwell on something important
- Really long sentences are awful to read

Report Length

- Stick to the word count (within reason)
- Readers don't want to spend too long on a report (War and Peace!)
- Protect yourself and the reader!

Illustrations – Identifying the Types

‘A picture is worth a thousand words’ is just as true in Engineering!

What is a figure and what is a table?

Figures

A figure is any non-text illustration:

Screenshots
Photos
Charts
Line Drawings
Graphs

Tables

**Text and/or numerical information displayed
in structured rows & columns**

Good way of displaying information:

List of equations
Results Data
Experiment Variables

**Don't clutter your graphs and tables! 3 easy to read graphs are better than 1 hard to read one!
Remember - every single figure and table must be captioned.**

Illustrations – Using Captions

Captions must be used so the reader can identify what the figure/table relates to. Must be numbered in order of appearance. Word has an easy-to-use captioning system built in.

Figure Captions go BELOW

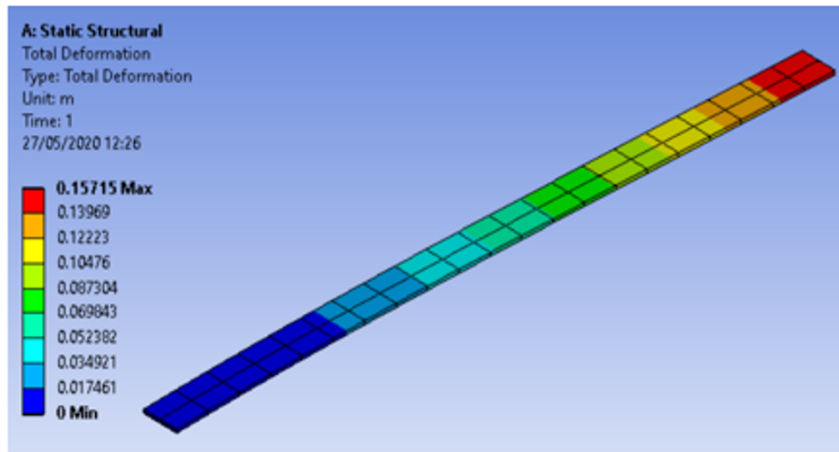


Figure 8 - ANSYS Cantilever Results

Table Captions go ABOVE

Table 1 - Cantilever Boundary Conditions

Material	Elastic-Plastic	Modulus of Elasticity	E	210000.000	MPa
		Poisson's Ratio	ν	0.000	
		Shear Modulus	G	105000.000	MPa
Geometry	Plate	Length	L	1.000	m
		Width	w	0.050	m
		Thickness	t	0.005	m
Load	Plate	Pressure	p	2750.000	Pa

REMEMBER UNITS!!!

Referring to figures

Always try and position the figure by the relevant section of the text

Don't use purely decorative/artistic figures – avoid cartoon images etc.

You must refer to the figure in your text – irrelevant figures should be removed

Refer to figures by their caption number, not position

Do - "As shown in Figure 8..."

Don't - "As shown in the graph below..."

Finishing a Report – What to Check?

Most important question: Has my report demonstrated the learning outcomes described in the assignment brief?

Proof Reading

- If you can, get someone else to proofread your report
- Read back over the report yourself and check the content
- Try and leave 48 hours between finishing it and checking over it (time management!)

Calculations

- Double check your calculations
- Make sure that graphs match your data

Formatting

- Double-check that your font size and paragraph formatting are consistent throughout
- Make sure your cover page has all the right information

Submission

- Convert your document to PDF format
- Once submitted to Moodle, open submission and make sure formatting is fine

Summary – What Have We Covered?

- An understanding of what a technical report is and why they are important to your chosen field.
- What to look for before you start writing
- The style you should use to write a technical report, and the sections that will make up the report
- How to correctly format the report
- How to correctly use illustrations in your report
- What to check after you have finished your report