



Report writing

Engineering



UNIVERSITY
OF WOLLONGONG
AUSTRALIA

INTRODUCTION

In industry, technical reports are used to communicate technical information. This information assists in decision making: for example, in the purchase of equipment, or finding solutions to technical problems. Technical reports are objective, and while they may include considerations of costs and other related factors, these are not the focus of the report. An important consideration when preparing technical reports is the audience and purpose of the report: for example, to brief managers, or to provide background research for technical supervisors. These factors determine the degree of technicality of the language and concepts involved.

At university, technical report writing is a frequently used assignment format in faculties of engineering and in the applied sciences. This is because the assignment tasks require students to draw theory and real world situations together, and to present the information in a structured and accessible format.

STRUCTURE

Technical reports use headings to divide information into sections. The headings help reader locate relevant information quickly. Below are some guidelines for structuring your report.

The front page should contain the following information:

- Faculty or School
- Subject name
- Project title
- Name(s) of student(s), student number(s)
- Contribution % of each student (for group reports)
- Name of Tutor/Supervisor (if applicable)

ABSTRACT OR EXECUTIVE SUMMARY (NEW PAGE)

The abstract or executive summary provides a summary of the report's essential information and usually is about 100 to 200 words in length. The abstract should summarise:

- background problem and purpose of report,
- brief details of the approach, procedure and/or methods,
- important results and/or findings,
- major conclusion(s).

Example: Executive Summary

The operation of garden taps can pose a difficulty for many tap users. This report describes and evaluates the range of possible design solutions this team has generated. The team identified a lack of commercially available solutions to the problem and designed three alternative solutions.

*background problem
and purpose of report*

Evaluation of the alternative solutions identified the tap handle extension, named "Easy Tap", as the optimal solution to the problem. This tap handle extension consists of a channel-type attachment, onto which a vertical tube is joined, which in turn supports a larger handle that is over twice the length of the existing tap handle.

*summary of
approach/method*

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Example: Executive Summary

"Easy Tap" is able to slide onto the existing tap handle, its over-size handle providing a greater torque-moment for the user that overcomes the difficulty of operating the tap. *key results / findings*

A commercial evaluation suggests that "Easy Tap" will not only be a possible design solution to the problem but will also be a commercially viable solution to the problem. *major conclusion*

TABLE OF CONTENTS (NEW PAGE)

This should include:

- all section headings and subheadings - numbered and worded exactly as they appear in the report,
- page numbers for all sections.

LIST OF FIGURES (NEW PAGE)

This list is used mainly for reports containing numerous figures. It includes the figure number, caption and page number, ordered as they appear in the text.

LIST OF TABLES (NEW PAGE)

This list is used mainly for reports containing numerous tables. It includes the table number, caption and page number, ordered as they appear in the text.

LIST OF SYMBOLS (NEW PAGE)

Where symbols are used extensively, a list of definitions should appear at the beginning of the report. If there is no list, any symbols used should be defined in the text when first used.

INTRODUCTION

This section gives the reader the necessary background information. Depending on the type of project/report, the Introduction can include:

- statement of the problem(s) and description of main aim(s) and objective(s),
- review of previous work/research and relationship to current project,
- explanations of terminology if necessary
- method(s) of approach,
- indications of scope and limitations of the study,
- outline of material presented in rest of report.

Example: Introduction

1.1 Problem Formulation

The operation of garden taps has been identified by this design team as a problem that stems from inherent design faults and other contributing factors. Some of these are:

- Tap Condition: Being constantly exposed to the outdoor environment, the tap unit as a whole deteriorates over time, causing corrosion of the spindle, [etc]

1.2 Design Criteria

The solution must eliminate the difficulties involved in the operation of a garden tap, [etc]



Example: Introduction

1.3 Restrictions

There were a number of restrictions on the design. These are:

- the solution must be economically sound so that it can be sold at a low price, but still return a reasonable profit, [etc]

1.4 Usage

The solution chosen will be marketed to people affected by the given problem. However, the elderly are the group of people most affected by this problem due to their vulnerability to mobility, [etc]

1.5 Proposed Production Volume

In reference to the Australian market, the aim would be to manufacture and sell approximately [etc]

1.6 Solution Outcomes

This report describes and evaluates the range of possible design solutions this team has generated to meet the design criteria and details the design specifications of the recommended, or optimal, solution, "Easy Tap". [etc]

BODY OF THE REPORT

The body sections expand and develop the material in a logical and coherent manner, reflecting the structure outlined in the Introduction. The type of headings you incorporate will depend on the purpose of the report you are preparing. Research type projects/reports can include:

- theory/modelling,
- methods and materials used,
- results/comparisons with theory and/or previous work,
- discussion and analysis of material.

For lengthy projects/reports, (d) can be integrated with (c). That is, discussions, analyses and summaries can be included as sub-sections immediately after the presentation of the results/comparisons.

Feasibility type projects/reports can include:

- problem identification,
- alternative solutions.

Example: main sections (excerpt)

2.1 Design solutions

The design team generated 3 possible solutions. Two of these designs are of the add-on tool design, comprising identical attachment mechanisms, with different handle designs. The third design incorporates a redesign of the tap operating mechanism.

2.1.1 Design A:

This design is of the extension type, a larger, extended handle that solves the design problem by providing the user with a larger turning moment. The larger handle means that the user has to exert less force to create the required turning moment to operate the tap, since torque is equal to force multiplied by perpendicular distance. The larger handle is also easier to grasp than the standard tap handle, reducing the painful strain on the user's hands.

This extension slides over the tap handle via a length of channel, allowing the device to be taken from one tap to another by the user. The extension is also light in mass, simple to construct and inexpensive to make (see Figure 2.3 for details of the basic design).



CONCLUSION

The conclusion(s) of a report must be related to, and resulting from, the material which appears in the report. The Conclusion must not introduce any new material. Quite often present tense is used. For example: “*the cement tested in this project is a good candidate for the dense-phase mode of pneumatic transportation*”.

Conclusions quite often read by managers before the main text of the report and hence, should summarise the main points clearly. This section also may include:

- reference to original aim(s) and objective(s) of report,
- application(s) of results,
- limitations and advantages of the findings,
- judgement/evaluation of the author(s).

Example: Conclusion

"Easy Tap" is suitable for all outside taps throughout Australia, as it suits tap handles with a diameter of less than 18 mm at their widest point. Provided users do not overtighten the tap valve; this solution successfully eliminates the difficulty of operating an outdoor garden tap. The solution is economically viable, due to its simple construction and the use of inexpensive materials and construction methods. An approximate cost of \$2.64 has been estimated for materials, thus a retail price in the \$5 to \$10 price range is envisaged. This price would cover joinery, painting, shipment, packaging, marketing, and labour costs and would provide a reasonable profit margin.

reference to aims and objectives

"Easy Tap" satisfies all of the restrictions as described in section 1.3, and satisfies the outcomes described in section 1.6. The tap handle extension; which has been named "Easy Tap"; is a light, maneuverable, durable and inexpensive solution. The "Easy Tap" successfully eliminates the difficulty of operating an outdoor tap, regardless of the tap's condition, the user's strength, the original handle size and the environmental conditions. "Easytap" is a possible and commercially viable solution for this design problem.

advantages of findings

evaluation of design

RECOMMENDATIONS

If required, recommendations should emerge from the conclusions of the report. This section is important to those who must act on the findings. Recommendations also may include suggestions for further work.

REFERENCES

All references to other authors or texts cited during the report must be listed in this section. Check with your tutor for any Faculty guidelines on referencing formats.

APPENDICES

If needed, appendices can be used to provide repetitive or lengthy information (eg figures/tables of results, statistics, lengthy derivations of equations, maps, drawings, letters, specification or data sheets, computer program information). Each separate appendix should be lettered (Appendix A, Appendix B, Appendix B1, Appendix B2, Appendix C, etc).



GRAMMATICAL FEATURES

Technical reports are formal, objective and should be logically developed. We have included some examples to highlight how you can achieve a suitable style through the choice of particular grammatical structures.

The design team *constructed 2 prototypes*: design A and design B. Construction of the prototypes was *achieved* using a hand angle grinder, a gas equipped MIG welder and a metal cutting saw.

'the design team' instead of 'we' helps create impersonal, formal style

The materials used in construction were those *specified* in the economical evaluation. After construction, the 2 prototypes were tested on a number of outdoor taps, and were both found to successfully *eliminate* difficulty in operating the taps. The slide-on channel fitting worked *exceptionally* well, *providing a secure* fit to the tap while being easy to attach and remove. The estimated handle sizes were correct, while the overall *dimensions* and *masses* of the 2 designs were also correct.

passive constructions ('prototypes were tested') helps create a formal, impersonal style – puts the focus on the test, not the person testing.

DISCIPLINE-SPECIFIC TERMS

This design is of the extension type: a larger, extended handle that solves the given problem by providing the user with a larger turning *moment*. The larger handle means that the user has to *exert less force* to create the required *turning moment* to operate the tap, since *torque is equal to force multiplied by perpendicular distance*. The larger handle is also easier to *grasp* than the standard tap handle, reducing the painful strain on the user's hands

Most disciplines have terminology that is specific to them. This writer has used terms and phrases that suit engineering and its technical nature.

FIGURES, GRAPHS & TABLES

All visuals that are included in a report should be explained and referred to in the main body of the report. A useful way to do this is to lead into the visual by telling the reader what to focus on and then lead out of the visual perhaps by linking the important point that was illustrated to the next salient point. For example:

As can be seen from Figure 5.4.1 below, when the tap handle is placed in an upward position the tap is closed. In contrast, when the tap handle, or lever, is moved to a downward position, the tap valve is opened by a pushrod that raises the normal washer and water flows (see Figure 5.4.2).

Figures would be placed here

By incorporating a ratchet locking system, similar to that used in an automobile handbrake, the lever can be locked in a number of positions, provided by graduations in the ratchet, allowing the user to set the flow rate, similar to a conventional tap.

'Lead-in' sentence shows what is to be noticed.

Figures being discussed are numbered for easy identification.

Figures must be both numbered and given an explanatory label.

'Lead out' sentence to conclude the point being made or link the discussion to the next point.

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