CHALMERS
UNIVERSITY OF TECHNOLOGY

Some Title

some subtitle

Master's thesis in Civilingenjörsprogrammet

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Division of Structural Engineering
Concrete Structures
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Master's thesis 201X:XX

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Colophon:
The thesis was created using LaTeX 2_ϵ and `biblatex` and edited on `www.sharelatex.com`. The typesetting software was the TeX Live distribution. The text is set in Times New Roman. Graphs were creating using PGFPLOTS and MS Excel. Figures were created using INKSCAPE.

Cover:
City Tunnel Diaphragm Walls, TEMP pic

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ABSTRACT

Here goes the text for the Abstract

Keywords: Permanent Diaphragm Walls, Diaphragm Walls, Functional Requirements

Some Title second language
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Research group's name second language
Chalmers University of Technology

ABSTRACT

This is the abstract text in the secondary language

Keywords: keywords in, second, language

CONTENTS

PREFACE

Here goes the text for the Preface.

Acronyms

FEM Finite Element Method. 2

Glossary

Polyhedron A solid in three dimensions with flat polygonal faces, straight edges and sharp corners or vertices.. 2

Nomenclature

Subscripts

b	aggregate
c	cement paste
cr	crack
el	elastic
I	largest eigenvalue

Greek letters

κ	largest equivalent strain (-)
σ	second order stress tensor (MPa)
ε	second order strain tensor (-)
ω	damage parameter
ρ	moisture concentration (kg/m^3)

Roman lower case letters

n	normal vector
h	element size (m)
w	crack width (m)

Miscellaneous

$\bar{\bullet}$	bar denotes macroscopic quantity
$\langle\bullet\rangle_\square$	homogenized quantity
$\parallel$	parallel
$\perp$	perpendicular

Superscripts

M	macroscale
s	subscale

Roman capital letters

E	fourth order stiffness tensor (MPa)
A	surface area (m^2)
E	Young's modulus (MPa)
V	volume (m^3)

1 Introduction

This is a template!

1.1 Background

Write about the thesis background here.

1.2 Problem description

This is where you describe you problem.

1.3 General aim

By now you know what to do here :)

1.4 Method / Outline

...

1.5 Objectives

...

1.6 References

Your reference data should be contained in `references.bib`. Open the file using a text editor and look at its content. Your own references need to have the same structure! You cite a reference in these ways:

- (pre note Harryson, 2014, post note)
- Alén, Lindvall, Johansson, Magnusson, and Norén (2006, Chapter 2)
- Harryson, 2014
- Harryson
- "Interview on functional requirements for permanent diaphragm walls"
- Box, Hunter, and Hunter, 1978; Harryson, 2014; MATLAB, 2016
- Ridcully (2000)

1.7 Cross-references

Cross-references within your own thesis are taken care of by the package `cleverref`. Making a cross-reference to a figure is done in this way: Figure 4.1 (the name in the curly brackets could be anything).

1.8 Equations

Here is how to typeset equations in LaTeX.

$$\sigma = E\varepsilon \tag{1.1}$$

and here is how to align several equations using the & symbol:

$$A = Bx \tag{1.2}$$

$$c + D + \frac{2}{\phi} = \sqrt{B} \tag{1.3}$$

and here is how to suppress numbering of equations

$$\sigma = E\varepsilon$$

and this is how to cross-reference to an equation: Equation (1.1).

1.8.1 In-line math

Use the $-symbol to typeset in-line math like so: $\sigma = E\varepsilon$. This important because in-line math should be italicized. For example, if you want to write the symbol for Young's modulus, it needs to be done in this way: E, not: E. If the letter "E" is italicized, then it is a physical quantity, namely Young's modulus, whereas a normal "E" is just an E.

1.8.2 Acronymes

Define you acronymes in `notation.tex`. Finite Element Method, FEM, Finite Element Method (FEM).

1.8.3 Glossaries

A glossaries can be useful to include for words that the reader is assumed to ha no prior knowledge of. You define your glossaries in `notation.tex` and the reference to them like this: Polyhedron, Polyhedron and Polyhedrons.

2 Units

Units are typeset using the package `siunitx`. Most numerical values you will typeset have units, except e.g. strain. Here are two examples of badly typeset units:

$$\sigma = 100mpa$$
$$\sigma = 100\ Mpa$$

The correct way looks like this:

$$\sigma = 100\,\mathrm{MPa}$$

The unit should *not* be italicized and should have a correct spacing between its numerical value. This is automatically taken care of by the package `siunitx`. Common units are typeset in this way: $10\,\mathrm{m}^2$, $10 \times 10^{-5}\,\mathrm{m}^3$, $10\,\mathrm{kN}$ and $10\,\mathrm{g\,m^{-2}\,s^{-1}}$. The number goes in the first pair of curly brackets, and the unit in the second pair. Typesetting units *without* numerical value is done in this way: kN.

3 Section headings

Here is how you subdivide your thesis into different levels:

3.1 Section

This is a Section

3.1.1 Subsection

This is a Subsection.

Subsubsection

This is a Subsubsection. Your should avoid levels below this one.

4 Graphics

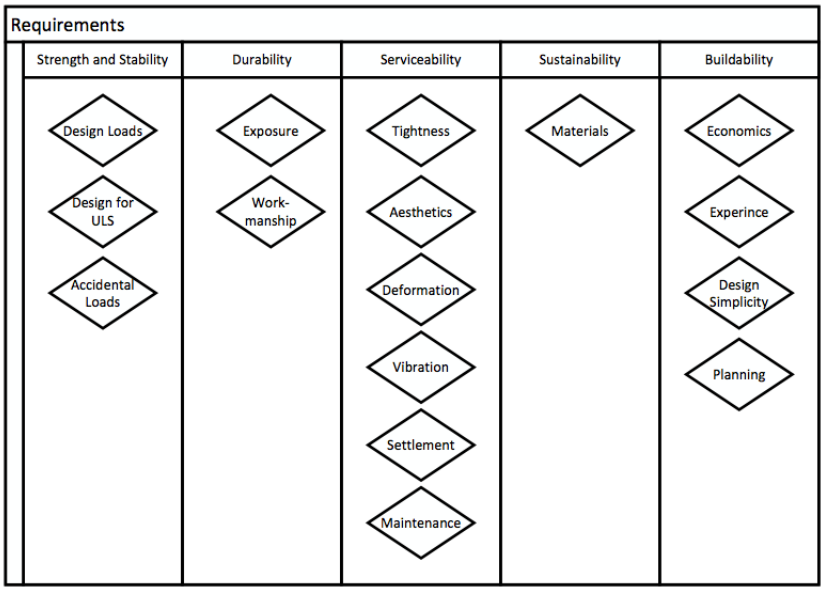
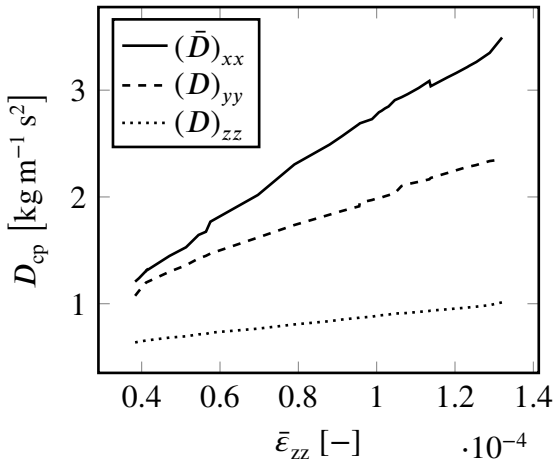


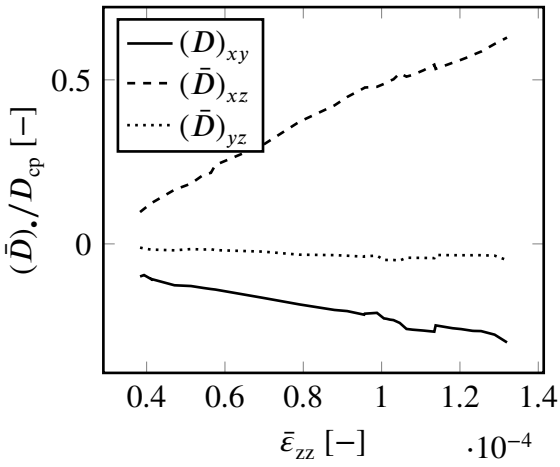
Figure 4.1: Functional requirements for Buildability.

4.1 Plots

Plots are preferably done using the package `pgfplots`. Below is an example given. The example also show how to put figures side-by-side in your document using the `\subfloat` command. Open `data.txt` in a text editor and have a look at its structure. The LaTeX document reads the data from the text file and produces a plot. Axes are automatically scaled depending on the data range given in the text file.



(a) Diagonal components of $\bar{D}$.



(b) Off-diagonal components of $\bar{D}$.

Figure 4.2: Components of the macroscale diffusivity tensor, $\bar{D}$, as a function of macroscale strain. Numerical values are normalized with respect to D_{cp}.

You can cross-reference to each of the figures in this way: Figure 4.2a and Figure 4.2b. You can also plot analytical functions `pgfplots` as shown in Figure 4.3 below.

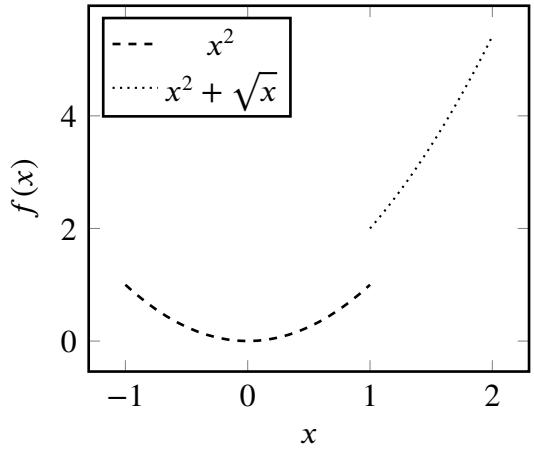


Figure 4.3: Examples of analytical functions.

References

Alén, C., Lindvall, A., Johansson, M., Magnusson, J., & Norén, C. (2006). *Slitsmurar som permanenta konstruktioner, sbuf 11603, ("diaphragm walls as permanent construction")*. SBUF. (Cited on page 1).

Box, G. E., Hunter, W. G., & Hunter, J. S. (1978). *Statistics for experimenters*. John Wiley and sons New York. (Cited on page 1).

Harryson, P. (2014). *Interview on functional requirements for permanent diaphragm walls*. Trafikverket. (Cited on page 1).

MATLAB. (2016). Design of experiments (doe). Retrieved February 3, 2016, from http://se.mathworks.com/help/stats/design-of-experiments-1.html?refresh=true. (Cited on page 1)

Ridcully, M. (2000). *An introduction to crossbow hunting*. University Lecture, Unseen University. (Cited on page 1).

A Your first Appendix

The contents of your appendicies go here.

B Your second Appendix

The contents of your appendicies go here.

C Your third Appendix

If you want to append separate PDFs, you can do it in this way. Note that the page footer (including page numbering) is superiposed in the apppended PDF.

Appended PDF