

CEE 142 – Soil Mechanics

GUIDE FOR PREPARATION OF WRITTEN WORK

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GENERAL

Introduction

Introduction to Soil Mechanics Laboratory has several objectives, including the production of professional quality, complete, and accurate engineering reports. The ability to effectively express oneself, both orally and in writing, is one of the most valuable, yet most overlooked, asset a professional engineer can possess. Therefore, this lab course will emphasize the creation of professional engineering reports, which convey the purpose, results, and conclusions of the experiments you will perform.

Academic Honesty

All reports upon which you attach your name must be the original, individual work of the author(s), unless specific prior instructions dictate an alternate situation (groups, teams, etc.). Proper credit should be given to the work of others (refer to the Works Cited section for further detail). Authors should be aware of the very serious consequences that will result by not meeting these expectations. Please refer to the appropriate sections of the Student Handbook and Departmental Guidelines to clarify any questions.

Format

All reports must be typed and double spaced (to facilitate editing and grading) on a word processor, and submitted on standard 8 ½" X 11" paper. Margins should be set at 1" on all sides unless the report is bound (or placed in a report cover) in which case the left margin should be set to 1 ½". Double sided printing is permitted. All preprinted data sheets should be filled out completely. Neatness and readability should be high priority items in preparation of the final report. Material should be in the proper order and securely stapled or bound.

In the body of the report, utilize headings and sub-headings in any style you feel appropriate, but be consistent throughout. As a suggestion, the main headings could be capitalized and in bold while sub-headings could be underlined (as shown in this document). Allow adequate breaks between sections and sub-sections or new sections, but it is not necessary to start a new page for each section.

The use of a spelt-checker is expected, and the use of additional editing .software (grammar checkers) is encouraged. In either case, careful proofreading (by someone other than the direct author) is essential, and "first-drafts" of reports should not be submitted.

Writing and Presentation Style

The use of slang, shop-talk, and other "field" phrases should generally be avoided. If a common expression is used during lecture as a generally accepted term, it may be utilized in the report. Otherwise, utilize only proper terminology and nomenclature. Either the passive or active voice may be utilized, but the voice should stay consistent throughout the document. Each paragraph in a report should express only one essential idea or recommendation. Lab reports, should not be overly verbose and should adhere to established practices for scientific writing.

TYPES OF REPORTS

Each week you will receive a project to work on which will include laboratory testing of soil samples and evaluating the results for use in a hypothetical engineering problem. Some labs may be grouped together so that a full lab report will only be submitted at the end, but you will hand in something every week. For weeks which do not require a full report, progress reports or memos will be submitted. The following is a brief synopsis of the types of reports which may be requested:

Formal Report

Cover Letter
Cover Page (see Figure 1 at end of guide)
Abstract/Executive Summary
Table of Contents
Introduction
Analysis
Results and Discussion
Summary and Conclusions/Recommendations
Limitations
Literature Cited
Appendix

(All sections may not be required for every report. The lab assignment will guide you in determining which sections are appropriate.)

Progress Report

- Cover Page (memo format)
- Recent Activity
- Summary of Current Status
- Projected Plans
- Literature Cited (if required)

Memorandum Report

A memo is limited to **one page in length** and responds to a specific question(s) or request(s). A general format for a memo is included as Figure 2 at the end of this guide. The text of the memo should include the factual information, analysis of a specific situation or condition, the rationale behind a decision, recommendation of a solution, etc.

CONTENTS OF REPORT SECTIONS

Cover Letter

The cover letter should include a definition of the overall project for which your work is a portion of, the scope of work for which your company was contracted for, and summarize the main findings of your work. It should begin with a greeting, and conclude with a closing that includes an opening for further contact or questions. It should not refer to any specific figures or tables, but must refer the reader to the attached report for detailed information concerning the project. It should be written in conventional business letter format, of which several styles are acceptable (any writing handbook should give good examples).

The letter should give the final conclusions and/or recommendations regarding the completed task or evaluation. Remember that the client will most likely separate the cover letter from the body of the report once he/she has received it. Therefore, the cover letter and report must be able to stand on their own. The cover letter should be able to be understood without reading the report, and the report should be able to be understood without reading the cover letter. This means that the letter and report will have redundant information.

Abstract/Executive Summary

An abstract or executive summary is a brief summary of the report. It must not include any information or conclusions which are not expanded upon in the body of the report. The abstract/ES should be limited to a maximum of one page (although ½ page is more common) and should state the objective of the study, the basic information provided by the client, and the main results/conclusions). Provide numerical values if the study is of a quantitative nature. The abstract/ES should be submitted on a separate page following the title page.

Table of Contents

Show the main report headings and page numbers. Sub-headings can be shown if individual portions of the report are long. Show the appendix and items included in the appendix in list format.

Introduction

The introduction should begin with a brief description of the scope of work for both the overall project and the task for which the report is prepared. It should state the extent of the study and the broad techniques which were employed (a field testing program, laboratory analysis, etc.). You should be able to answer questions such as:

- What is the project for which this work was conducted for?
- What are the objectives of this study?
- What is the relevance of the work?
- What were the significant previous developments? (Cite all references such as past reports)

Analysis

Depending on the focus of the report, the following components may be utilized in responding to the need for information:

- | | |
|------------|---|
| Narrative- | A brief description in text/paragraph form, summarizing the important aspects of the items/concepts under consideration. This will usually be done in chronological order and include all significant names, dates, places, agencies, etc. The method of testing should also be mentioned in this section. Refer to standard ASTM test procedures and/or non-standardized procedures which are detailed in an Appendix. |
| Facts | An itemized listing or text description of significant information. For example, in a lab report this should include a visual description of the material tested (color, gradation, grain size particle shape, etc.) and a USCS classification |

Issues	A list or text description of the questions to which the client is searching for answers. In most circumstances, this represents the area(s) where an action or decision is expected or desired. This closely represents the theory portion of past reports, stating how the specific test, study, etc. will provide the required conclusions.
Graphics	For work which is highly quantitative (meaning you are supplying the client with a value(s)) plots, graphs and figures may be the most effective way of conveying the information. All Figures and Tables should meet the requirements of the section on Figures and Tables, presented later in this guide. Figures and Tables can be integrated into the body of the report, or can be placed at the end of the section.

Results and Discussion

This section should include a discussion of all the results and calculations presented in the report and appendix. Comment on the accuracy and/or precision of the tests, the validity of any correlations, etc. It is critical to discuss any assumptions made during the calculation of. When possible, a comparison of the current results should be made to published or typical values (remember to cite references). State how the results will be applied to the problem at hand.

Summary and Conclusions/Recommendations

This section should clearly and concisely present the final results and general or specific recommendations and conclusions. You should refrain from making any recommendations or conclusions until this section. It should also relate the value of the work performed to the objectives of the assignment. Material in this section should include, but not necessarily be limited to, answers to questions such as:

- What significant results were obtained?
- What important conclusions were reached?
- What is the principal significance of the work?
- What action(s), if any, should be taken?
- What further testing, if any, is required?

Specific information regarding **YOUR decisions, choices and recommendations** should be presented. Limited justifications can also be presented as necessary. Below is a listing of several items which you will want to keep in mind when writing the conclusions/recommendations

for any report:

- Do not supply more information than was asked for. Do not give additional recommendations other than those which the client asked for in their letter or in a project contract.

- Avoid subjective descriptors (e.g. significant settlement will occur, large permeabilities, minor erosion and sedimentation quantities, etc.), rather let the facts speak for themselves or relate the quantities to standards published by agencies, universities, etc. for different classifications (e.g. Based on _____ the Soil Conservation Service classifies this soil as having a high potential for erosion).
- If you are uncertain about a result, conclusion or recommendation, express it (e.g. probably, unlikely, possibly). Also, the use of definitive terms (always, never, cannot, etc.) should be avoided in a report. Your results, conclusions and recommendations are based on engineering experience, judgment and the best available information, all of which are constantly changing.

Limitations

Geotechnical work, by nature, is often based on limited data and/or field investigations. Unlike structural or mechanical engineering, where important factors (e.g. loading, strength, cycles, etc.) can be estimated with a fair degree of certainty, geotechnical work involves many situations which are characterized by a high degree of uncertainty. The client must be made aware that engineering judgment was used and that the recommendations of the report may, and most likely will, change if new site information becomes available. They also need to be made aware that the information included in the report is for the specific project and location only. It cannot be transferred to another similar site or project on the same site. An example Limitation Statement is shown below:

The foregoing evaluations, conclusions and recommendations represent professional engineering judgment based on the available data, appropriate analytical techniques and relevant experience. It should be understood that there are uncertainties associated with the evaluations and interpretations used to form these judgments, conclusions and recommendations. These uncertainties include the effects of complex geology, the assessment of the nature and extent of site soils, the accuracy of published data, the limitations of analytical techniques, and the presumed activities and results of future construction activities. While uncertainties are a part of all engineering work, it should be noted that this project has been carried out in accordance with reasonable and accepted engineering practices. It is emphasized that this report pertains to the _____ project only and we assume no responsibility should this information be utilized for any other project, either on or off site. No warranty or guarantee, either written or implied, is applicable to this work.

Literature Cited

References should be listed on a separate page in alphabetical order according to author or editor. Use standard ASCE format as illustrated below:

Journal Article:

Azzouz, A.S., Maiek, A.M., and Baligh, M.M. (1989). "Cyclic behavior of clays in undrained simple shear." *J. Geotech. Engrg.*, ASCE, 115(5), 637-657.

Conference Paper:

Hashiguchi, K. (1977). "An expression of anisotropy in a plastic constitutive equation of soils." *Proc. 9th Int. Conf. On Soil Mechanics and Foundation Engineering*, Tokyo, 302-305.

Book:

Schofield, A.N., and Wroth, C.P. (1968). *Critical state soil mechanics*. McGraw-Hill, London, England.

Within the text, references should be cited at the appropriate place by a parenthetical note including the last name of the author (or both if two, if three+ use first author's name and et al.) and the year of publication - such as: (Smith, 1990); (Smith and Jones, 1991); (Smith et al., 1992).

Appendices

Appendices should be numbered or lettered and each appendix used should be referenced in the main text of the report. Appendices should include information which is relevant to the report, however, information that is critical to the main findings should be included as a Figure or Table in the main portion of the report. Examples of appendix titles are:

Appendix A - Raw laboratory data

Appendix B - Soil boring logs

Appendix C - Sample calculations (only one sample for each type of calculation)

Appendix D - Computer analysis

REQUIREMENTS FOR FIGURES AND TABLES

All figures and tables should meet the following guidelines:

1. Every figure and table must have a number and should be referenced in the main body of the report as such. Numbers should follow the order in which they are mentioned in the report. The word "Figure" or "Table" is capitalized when used in the report.
2. Tables and Figures should have descriptive titles (e.g. - Fig. 1 - Moisture Density Curve, Sample A)
3. Tables and Figures should be self contained, including sufficient information to allow for their removal from the body of the report. The project name, material type, date of test, test format and company name should be included on all tables and figures.
4. Tables and Figures should be presented either from the bottom or right-hand sides of the page. Portrait and landscape printing may be utilized as appropriate for presentation.
5. Data points should use distinguishing symbols and markers. Lines drawn to fit data should be computer generated (if linear) or drawn with a trench curve.
6. Avoid multi-colored graphs as they do not photocopy well.

GRADING

Written work is due on time and complete. No late work will be accepted without a written excuse from the Dean's Office.

Overall grading will follow the following format.

Clarity of writing: 25%

Appropriate vocabulary; logical presentation; consistent style; **sufficient editing**.

Content: 25%

Value of information included (and excluded) in the discussion; extent to which a variety of approaches is considered; accuracy/precision of results/facts.

Analysis and Synthesis: 25%

Scope and depth of consideration by the author(s) of the primary topic and information; logic of conclusions.

Organization and Format 15%

Compliance with the expectations of this guide.

Writing Mechanics 10%

Spelling; punctuation; page numbers; proofreading; grammatical errors.

REPORT OF INVESTIGATION

PROJECT NAME

PROJECT LOCATION

PREPARED FOR:

PREPARED BY:

Project Number:

Date:

Figure 1 - Title Sheet example

MEMORANDUM

Date:

To:

From:

Regarding:

Cc:
