CIV2202 :1 WHAT IS SURVEYING

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PREVIEW

Introduction

These Notes are **not** intended to be a text book. The text book recommended is an excellent one for this course, and I strongly suggest that you buy a copy and read it. Consequently, each chapter of these notes refers to a chapter in the text book, and Exercises are also set from there. These Notes give you are a more concentrated version of the material by focussing on the things that are most important to know.

At the start of each chapter will be a summary of the really important things you need to know. This chapter shows where Surveying fits into any **Civil Engineering project**, and should convince you of the need to know something about the subject. The concept of **accuracy** is introduced, and the need to build **redundancy** into **every** survey. Redundancy means collecting more data than you actually need to calculate the quantities you need.

Objectives

After completing this topic you should appreciate the need for surveying in civil engineering, and in broad terms, the elements of surveying.

Readings

Read Muskett, Chapter 1

REQUIRED

WHAT IS SURVEYING?

Surveying encompasses all methods for gathering and processing information about the physical Earth.

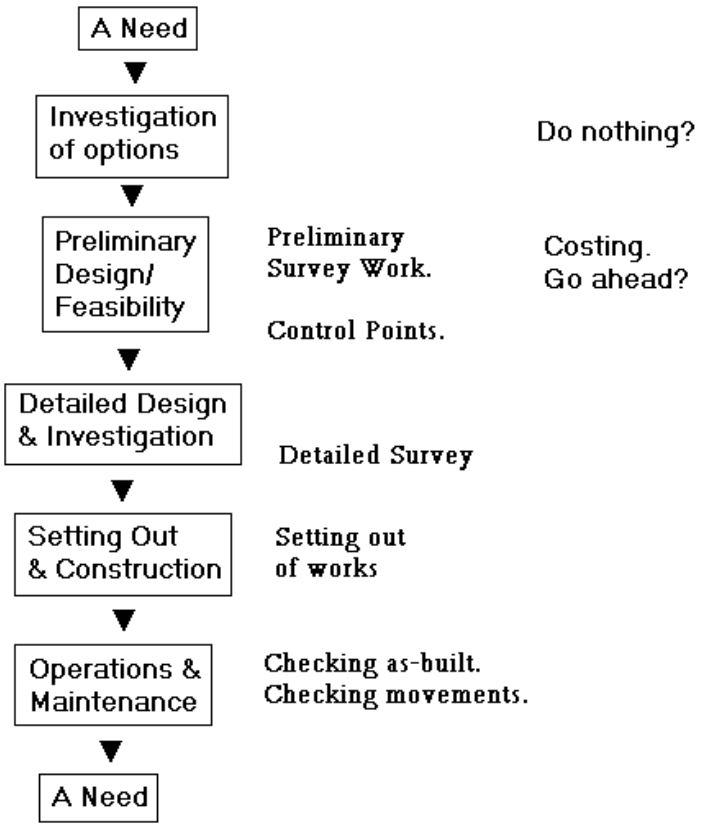
There are 6 parts to a Surveyor's Work

- **Decision making** - selecting techniques, equipment, etc
- **Field Work** - data acquisition
- **Data processing** - calculations to give locations, areas, volumes, etc
- **Mapping** - maps, plans, charts
- **Marking** - pegging boundaries, construction, etc (setting out)
- **Reporting** - logical conclusion of the task

WHY SHOULD I STUDY SURVEYING?

Because it's essential for every civil engineering project. You may be required to perform simple surveying operations (particularly if you're employed in Local Govt), or you will need to discuss your needs with surveyors.

Surveying in a Civil Engineering Project



2 phases to any Surveying project

(i) **measurement** of existing features (both natural and man made) and transfer to the design office

(ii) transfer design parameters to the field, which is the process of **setting out** (eg. buildings, road centre lines, ...)

WHAT IS MEASURED?

1. **distances** - to calculate areas, volumes, etc.
   - to draw plans, maps, etc

2. **angles** - both horizontal and vertical

3. **heights** - levels or elevations (the third dimension)

HOW ARE THESE MEASURED?

1. **Distance** - pace, plastic tape, steel band, EDM, theodolite

2. **Angles** - optical square, compass, some levels, theodolite, clinometer

3. **Levels** - sighting, level, theodolite, rotating laser, barometer

WHICH INSTRUMENT SHOULD I USE?

1. What **accuracy** is required?

2. Is **time** available to achieve this accuracy?

WHAT IS ACCURACY?

Accuracy is the nearness of your measurements to the true value.

For example, if you measure a 100.000 m line as 100.005, then your accuracy is 5 parts in 100,000, or 1 in 20,000.

1. You must be familiar with the accuracy that can be achieved with each instrument.

2. You will normally make a decision about the level of accuracy required for your particular task.

We will talk about accuracy in more detail soon, and throughout the course. It is an important concept.

WHAT IS PRECISION?

Precision can be defined as the spread of your results or their repeatability. Standard deviation describes precision.

Remember the Golden Rule of Surveying!

CHECK IT!

* and then check it again!

* build **redundancy** into a survey,

  and take care in measurement, booking etc.

Activity 1.1

Revise standard deviation, mean and standard deviation of mean (Muskett pp 193, 194)