HIGHER TECHNICAL INSTITUTE

CIVIL ENGINEERING COURSE

DIPLOMA PROJECT

PRODUCTION OF A TOPOGRAPHICAL MAP

C/901

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CHAPTER 1: INTRODUCTION

1.1 DEFINITION

Surveying may be defined as the science of determining the position, in three dimensions, of natural and man - made features on or beneath the surface of the Earth. These features may then be represented in analog form as a contoured map, plan or chart, or in digital form as a three-dimensional mathematical model stored in the computer. The latter format is referred to as a digital ground model (DGM).

In engineering surveying, either or both of the above formats may be utilised in the planning, design and construction of works, both on the surface and underground. At a later stage, surveying techniques are used in the dimensional control or setting out of the designed constructional elements and also in the monitoring of deformation movements.

In the first instance, surveying requires management and decision making in deciding the appropriate methods and instrumentation required to satisfactorily complete the task to the specified accuracy and within the time limits available. This initial process can only be properly executed after very careful and detailed reconnaissance of the area to be surveyed.

When the above logistics are complete, the field work - involving the capture and storage of field data - is carried out using instruments and techniques appropriate to the task in hand.

The next step in the operation is that of data processing. The majority, if not all, of the computation will be carried out by computer, ranging in size from pocket calculator to mainframe. The methods adopted will depend upon the size and precision of the survey and the manner of its recording; whether in a field book or a data logger. Data representation in analog or digital form may now be carried out by conventional cartographic plotting or through a totally automated system using a computer - drive flat - bed plotter. In engineering, the plan of DGM is used for the planning and design of a construction project. This project may comprise a railroad, highway, dam, bridge, or even a new town complex. No matter what the work is, or how complicated, it must be set out on the ground in its correct place and to its correct dimensions, within the tolerances specified. To this end, surveying procedures and instrumentation are used, of varying precision and complexity, depending on the project in hand.

Surveying is indispensable to the engineer in the planning, design and construction of a project, so all engineering should have a thorough understanding of the limits of accuracy possible in the construction and manufacturing processes. This knowledge, combined with an equal understanding of the limits and capabilities of surveying instrumentation and techniques, will enable to engineer to successfully complete his project in the most economical manner and shortest time possible.