Geoids Undulation of Sri Lanka With Special Reference To Diyathalawa.

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By

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Geoid Undulation of Sri Lanka

With Special Reference to Diyathalawa

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ABSTRACT

My main objective was to create an undulation model as to cover the Entire country by using existing data. But after a while start of the literature study I realized that without having clear study about the geoid undulation changing patterns, useless to build up the undulation model for an area. So my Supervisor also agreed with my idea and then the study area was selected. (The selected figure situated in inside the Institute of Surveying and Mapping).

The concept of undulation was dealt with the geodetic survey. But after the GPS technology developed it became a widely considering factor. Because without knowing the undulation of considered point it's Geoid height could not be calculated by using ellipsoidal height directly given by the GPS. So automatically the GPS observations become the back born of the concept of Geoid Undulation. Due to that factor so many attention had to be paid on matters regarding GPS observation. The widely used other surveying techniques were leveling and Total Station Traversing.

Any how my utmost effort was, built up a model, by using Arc GIS software, to calculate Geoid Undulation related to any point of the study area and then determine the Geoid height by using the ellipsoidal height of that particular point given by the GPS. Ultimately my effort got succeeded as indicate in this thesis.

DECLARATION OF THE CANDIDATE

The work described in this thesis was carried out by me under the supervision of Dr. RanjithPremesiri and a report on this has not been submitted in whole or in part to any university or any other institution for another Degree / Diploma.

2015/04/08

Signature of the Candidate

Date

DECLARATION OF SUPERVISOR

I certify that the above statement made by the candidate is true and that this thesis is suitable for submission to the University for the purpose of evaluation.

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Signature of the Supervisor

08/04/2015

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Date

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DEDICATION

I hardly dedicate this thesis to my loving wife, son and daughters

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Chapter 1

1. INTRODUCTION

1.1 BACKGROUND

Basic surveys has occurred since human built the large structures.

e.g. - Stonehenge in Britain (constructed in 2500 BC) was set out by pre historical surveys using peg and tape geometry

Figure 1.1:Stonehenge

-In ancient Egypt when the Nile river overflowed it s banks and washed out farm boundaries, boundaries were reestablished by a rope stretcher or surveyor through the application of simple geometry.

- another example for historical surveying is nearly perfect sureness and north south of the great pyramids of Giza, built in2700 BC.

- Groma instrument oriented in Mesopotamia in early 1st millennium BC

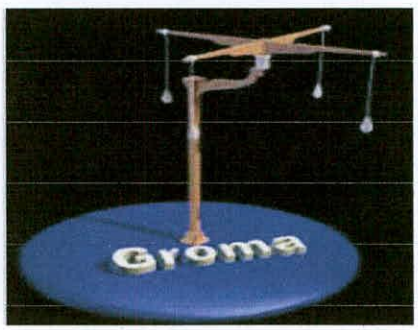

Figure 1.2: Groma instrument

-When consider the Romans under them land surveyors were established as profession and they established basic measurement for tax registration of conquered lands(300AD)

- In England the Doomsday book commissioned by William the conqueror in 1086 recorded the names of all land they owned, the area of land they owned, quality of the land and specific information of the area's content and inhabitants although it did not include maps showing exact location.

1.1.1 Flow of development of survey techniques.

Chain Survey (Gunter's chain) -16th century

Theodolite survey (Traversing), Compasssurveying and Plane Table surveying -17th century.

Triangulation with Theodolite - 16th, 17thand 18th century

Electromagnetic Distance measuring (EDM) and Global Positioning Systems (GPS) surveys – 19th century onward.

1.1.2 Definitions of surveying.

When consider the above matter several definitions can be found.

- Surveying or land surveying is the technique , profession and science of accurately determining the terrestrial or three dimensional position of points and distance and angle between them.
- Surveying has been traditionally defined as the science and art of determining of the relative positions of points above , on or beneath the earth or establishing such points.

1.1.3 Recent history of the surveying.

At the beginning of the industrial revolution

- The importance of exact boundaries and demand of public improvement s(i.e. railways, canals, roads etc.) bought surveying in to a prominent position.
- More accurate instrument were developed.
- Science of Geodetic and plane surveying were developed.

1.1.4 Surveying Today

Today surveying affected on our daily events, as mentioned bellow.

- To map the earth above and the bellow the sea.
- To prepare navigational maps(land ,air, sea.)
- To establish boundaries of private and public lands.
- To develop databases for natural resources management.
- Development of engineers data for

  Bridge construction

  Roads

  Building

  Land Development

1.2 Problem Definition

To define the problem clearly, some technical terms have to be used.

Eg. Geoid undulation, Ellipsoidel height, Authometric height, etc.