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## நில அளவைச் சஞ்சிகை

# SURVEY JOURNAL

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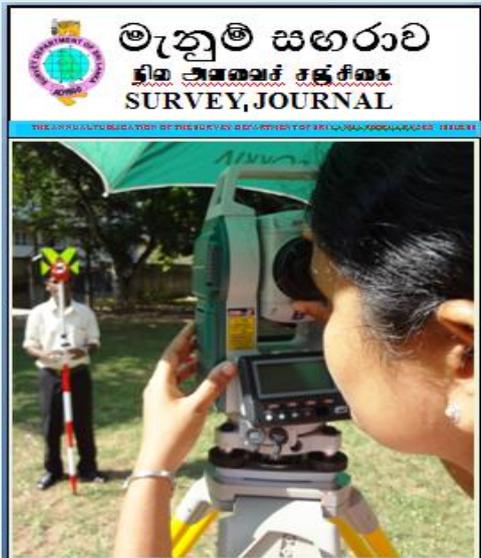


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The Surveyor General does not necessarily agree with any opinions or recommendations made in any article in this journal, nor do they necessarily represent official policy.



Nowadays Survey Department uses Totalstations for data collection in entire country.

A totalstation is an electronic/optical instrument used in modern surveying. The totalstation is an electronic theodolite (transit) integrated with an electronic distance meter (EDM) to read slope distances from the instrument to a particular point.

The front page shows a lady Surveyor surveying with a totalstation.

## TABLE OF CONTENTS

Thesawalamai Law – A point of view Dr. K.Thavalingam, Additional Surveyor General	Page 1
e- Government concepts and practices in Sri Lanka B.D.Chandragupta, Snr, Supdt. of Surveys Cadastral system in Kingdom of Bahrain and Sri Lanka Land Titling A.Dissanayake, Provincial S.G. (NWP)	Page 4 Page 9
Applications of Information Technology in Survey Department Activities D.N.D. Hettiarachchi, Provincial S. G. (SAB)	Page 13
ඉතිහාසගත පිඹුරු A.M.N.Bandara, Senior Supdt. of Surveys	Page 17
The Techniques and Vital Applications in Surveying Anil Collure, Registered Licensed Surveyor	Page 20
Geo Spatial Data Provision and User Requirements K.K.B.N.Fernando, Senior Supdt. of Surveys	Page 24
Methods of Geoid Modeling D.G. Suranimala, Registered Licensed Surveyor	Page 27
ආයතනයන්හි "ශ්‍රමික සම්බන්ධතා" ජී.ලෙස්ලි හේමචන්ද්‍ර, මිනිස්දෝරු අධිකාරී	Page 30
A challenging task ahead for National Mapping Organizations: On-demand web mapping with vector representation K.A.B.S. Rupasinghe, Supdt. of Surveys	Page 33
3D Geo-information from image based modelling N.M.A. Wijeratna, Supdt. of Surveys	Page 37
உற்பத்தித்திறனும் நிலஅளவை அலுவலகங்களில் 5 எஸ் செயற்திட்டமும் பொ.சிவானந்தன், நில அளவை அதிகாரி	Page 42
FLASH BACK OF SURVEY JOURNALS M.T.M. Rafeek, Supdt. of Surveys	Page 45
Pictures of Survey Department at 'Deyata Kirula' Exhibition 2012	Page 52

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## Thesawalamai Law – A point of View

By

Dr.K.Thavalingam, Additional Surveyor General

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### 1.0 Introduction

The customary and personal laws are based on ancient customs of the Sinhalese and Tamils whose ancestors hailed from specific regions in the country, as well as the customs of the Muslims.

In the 18<sup>th</sup> century, Roman-Dutch law was increasingly used in the south-west and the south. As a consequence, private property (land) rights spread rapidly in these areas, and property transfers were subject to Roman-Dutch law. The Dutch also made efforts to codify the customary law of the different ethnic groups.

Apart from the General Law (based on Roman-Dutch law) of Sri Lanka there are three personal customary laws – Kandyan law, Muslim law and Thesawalamai law – and they all operate strictly within limited parameters. The Kandyan law applies to the Kandyan Buddhists, while the Muslim law applies to all Muslims in Sri Lanka.

### 2.0 Theswalamai Law

'Thesawalamai', in Tamil, literally means the 'customs of the area/land'. **Theswalamai Law** is based on ancient customs of Jaffna Tamils in Sri Lanka. It applies to Tamil inhabitants of the Jaffna Peninsula in Northern Sri Lanka. This customary and personal law also applies to numerous Jaffna Tamils who no longer live in the Jaffna Peninsula.

It is a commonly held belief among many in Sri Lanka that Thesawalamai applies only to Jaffna Tamils who reside in the Jaffna peninsula. The Supreme Court of Sri Lanka, however, ruled in a 1988 case, "*Sivagnanalingam v. Suntheralingam* that *Thesawalamai* is a personal law that applies to Jaffna Tamils wherever they live in the country, and that it applies also to their movable and immovable property, wherever it is situated in the country. The Supreme Court, overturning decisions of the lower courts, held that *Thesawalamai* would not apply to Jaffna Tamils only if there is "unequivocal evidence of abandonment of...inhabitanacy in Jaffna."

This Supreme Court ruling suggests that a Jaffna Tamil could live for decades in another part of the country and not lose "Jaffna inhabitanacy" if he or she, for instance, continues to own property in the Jaffna Peninsula, or even visits Jaffna on a somewhat regular basis. The ruling also indicates that each case must depend on its own facts.

The only *Thesawalamai* laws that are now applicable to Jaffna Tamils relate to property and interstate succession resulting from marriage.

*Thesawalamai*, which was codified by the Dutch in 1706, gained legal validity when the British enacted the *Thesawalamai Regulation No. 18 of 1806*. Other relevant laws are *Ordinance No. 5 of 1869*, the *Matrimonial Rights and Inheritance Ordinance of 1911*, amended by *Ordinance No. 58 of 1947*, The *Thesawalamai Ordinance* and *Thesawalamai Pre-Emption Ordinance*, and the *Jaffna Matrimonial Rights and Inheritance Ordinance No.1 of 1911*.

### **3.0 Thesawalamai and Ownership of Property**

This law is widely spoken for its recognition to the necessity of women's ownership to land and property for the security of their future. According to Thesawalamai the property can be divided into three categories – Mutisam, Chitanam and Tetiyatetam.

1. Mutisam is the inherited property of the man from his parents.
2. Chitanam is the inherited property of the wife from her parents. And
3. Tetiyatetam is the acquired property of the man and wife during their lifetime together.

The ownership of above types of property is given as follows:-

- The daughters inherit the Chitanam of the mother, while the sons inherit the Mutisam of the father.
- The acquired property is divided equally among the sons and daughters.
- Thus the inheritance of the man and wife remain separate.
- When a widow remarries the daughters of both marriages get her property.
- When a widower remarries he must ensure that the wife's dowry go as dowry to the daughters of the dead wife, while fifty percent of his Mutisam will be shared among the sons of the dead wife and fifty percent of the acquired property (till then) shall be shared among all the children of the dead wife.
- In the event of a divorce the wife gets her entire dowry and half the acquired property.
- The right of the woman to her dowry and acquired property reduced to a great extent their dependency status on others, while it also strengthened the status of a single woman in the society.

During the period of codifying this law women were not gainfully employed, thus the law is considered advantageous for women. However, there are certain restrictions in this law – this law prevents women from having free control over her own rightful property. A law that recognizes the labour of a housewife as part of contributing to the husbands economical achievement, and her right to own her property separately, restricts the woman from taking decisions on the disposal of her property.

Chithanam is divided into three parts: cash, jewellery and land or house. While the movable property can be sold or mortgaged by the wife the immovable property can only be mortgaged or sold with the consent of the husband. Whereas the husband need not consult his wife when he intends to sell or mortgage his inherited property or acquired property.

### **4.0 Misperception of the law of Thesawalamai**

The late Dr. H. W. Tambiah Q. C. who was the leading authority on the subject of Thesawalamai was of the opinion that Thesawalamai recognized only one domicile i.e. a Ceylon (Sri Lankan) domicile and that it is wrong to assume that Thesawalamai is based on a 'homeland theory' as has been propounded by some politicians. The (Thesawalamai) concept has been greatly misunderstood with the consequence that incorrect inferences have been drawn.

One widespread wrong belief is that Sinhalese cannot buy land in the Northern Province consequent to the law of pre-emption contained in the Thesawalamai. Pre-emption, under Thesawalamai, may be explained as a right recognized over immovable property situated in the Northern Province of Sri Lanka by which a co-owner, co-sharer or adjacent landowner, who has a mortgage of the land in question, has the right to demand the seller to sell it to him

at a price which any bonafide purchaser is prepared to pay a higher price than the persons who are entitled to pre-empt.

Thesawalamai Pre-emption Ordinance No.59 of 1947 regulates the law in relation to land affected by the law of Thesawalamai. This Ordinance came into force on July 1, 1948, repealing so much of the Thesawalamai and of the Ordinance No.4 of 1895.

The term 'Pre-emption' means that certain classes of persons enjoy a preferential right to purchase immovable property over others. This right of pre-emption under the present law is restricted to two classes of persons, namely (1) Co-owners and (2) Heirs in the event of the intestacy. Accordingly, when immovable property is co-owned, one co-owner cannot sell the land to an outsider without first offering it to the other co-owner or heirs whether he is a Sinhalese or otherwise.

The right of pre-emption shall only be exercised in respect of an undivided share or interest of an immovable property. It shall not be exercised in property held in sole ownership. If the land to be sold is a divided and defined allotment of land, no right of pre-emption shall exist. In that case, the vendor shall have the absolute right to sell the same to any person whom he prefers, whether he is a Sinhalese or not. No provision of the Ordinance prevents him from selling the land to a Sinhalese. No reasonable man would refuse to sell his property to the highest offeror of consideration.

A pre-emptor has to be a co-owner or an heir of an undivided allotment of land. He can be a Sinhalese, a Tamil, a Muslim or any person of any other race. If an owner of an undivided land has conveyed it to an outsider, a pre-emptor has the right to institute an action to set aside the sale of an undivided share of the land on any of the grounds set out in the Ordinance.

Thesawalai being primarily a codified law, however, has not been able to evolve with time or take into account social changes which have, over the years, taken place in Sri Lanka or elsewhere. Certainly, the time is ripe for urgent reform this and other areas of Thesawalamai. But changes must necessarily take place through legislative intervention.

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**If you don't like something change it;**

**if you can't change it, change the way you think about it.**

**~Mary Engelbreit**

# **e-Government Concepts and Practices in Sri Lanka**

by

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Senior Supdt. of Surveys (Computer)

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## **1. Introduction of e-Government**

e-Government is a process of reform in the way Governments work, share information, engage citizens and deliver services to external and internal clients for the benefit of both government and the clients that they serve.

e-Government improve delivery of services to citizens, businesses and employees; engage citizens in the process of governance through interaction; empower citizens through access to knowledge and information and make the working of the government more efficient and effective.

## **2. e-Government intend to achieve**

E-Government intends to transform the government from hierarchical, less customer oriented and inefficient bureaucratic entity to a more efficient, customer-centric, system driven and more productive entity. Thus, e-Government could be perceived as a dynamic force that leads to a paradigm shift in public management and governance. E-Government brings about change in two main aspects of government. Firstly, e-Government improves the internal aspect of government by increasing administrative efficiency and rationalization of decision making. Secondly, it impacts on the external aspect of government by improving relations between the government and the citizen and businesses largely through the provision of on-line administrative services and information.

As indicated in e-Government Policy, a publication released by the Information Communication Technology Agency of Sri Lanka (ICTA) in 2010, the objectives of e-Government are the following.

- Provide more convenient and better services to citizens
- Improve participation of clients
- Use of social media to ensure better service provision
- Develop better relationships with clients
- Enhance good governance

## **3. e-Government stakeholders**

There are three major stakeholders of e-Government namely, the Government, citizens and businesses. The leaders and managers as well as employees of public sector institutions, elected representatives, suppliers of hardware and software required for developing, installing and maintaining electronic solutions and e-Government capacity building institutions also play an important role and therefore can be considered as e-Government stakeholders. The e-Government Policy (ICTA, 2010) identifies four types of e-Government services based on the categories of stakeholders.

- **Government to Citizen (G2C) services**

Majority of the e-Government services come under this category. Examples are online delivery of vehicle licensing services, online issue of births, marriages and death certificates, online checking of balances in provident fund accounts, online booking of train tickets etc. The benefits of G2C services include;

- Enhanced living standards of citizens
- Convenient and speedy access to government services and information
- Availability of multiple service channels
- Improved reliability of public services
- Less time spent for obtaining public services
- High transparency in public finance and decision making
- Less room for corruption

- **Government to Business (G2B) services**

In Sri Lanka private sector has been considered as the ‘engine of growth’ and the role of government was seen as that of a facilitator of private sector- led business growth. E-Government plays an important role in facilitating private sector investments by improving the efficiency in the delivery of public services and information. Some examples of G2B services include e-procurement, e- Company Registration, online tax payment, and Government Information Centre 1919 facility. The benefits of G2B services include;

- Ability to carry out transactions with government institutions in a fast and friendly manner
- Convenience in dealing with government
- Enhanced opportunities to make investments and meet market demand for goods and services
- Government contribution to develop the ICT sector

- **Government to Employees (G2E) services**

The public sector employs over one million people spread through out the island. Thus, integrating ICT to provide services required for proper human resources management is of high importance. Some examples of G2E services provided by the government are, Employee Provident Fund Services, e-Human Resource Management and e-Pensions. The benefits to the employees of these services include;

- Employees are able to transact business with the government in a transparent manner
- Convenience due to automated payroll, attendance, transfers, pension payments etc.
- Work is more streamlined and paper work is cut down
- Greater acceptance and recognition

- **Government to Government (G2G) services**

Streamlining the service delivery system of government agencies through improved communication and coordination is a necessary condition for achieving greater internal

efficiency of government. G2G services play a vital role in this regard. Examples of G2G services include e-mail and video conference for convenient communication and better information sharing, integrated financial management systems, and integrated human resource management systems. The benefits of these services to government organizations include;

- Higher efficiency and effectiveness
- Better regulation of services delivered by government organizations
- Higher level of transparency
- Less room for corruption
- Speedy communication facilities
- Effective use of government information for better decision making

#### **4. Stages of development in e-Government**

According to Cheol H. Oh, e-Government goes through four stages of development.

##### **Stage 1: Information Provision**

At this primary stage public organizations use homepages to provide general information such as mission, types of services provided, contact details and perhaps hours of service as well as documentation via the web.

##### **Stage 2: Interaction**

This stage adds a basic search function, download forms, and service links to other websites to provide easier access to important information online.

##### **Stage 3: Transaction**

At this stage customers are able to conduct business services online, and use the web to supplement other service delivery channels. Compared to the preceding stages the transaction stage is more advanced because the clients can get different services online through the organization's website which may be linked to websites of other organizations that provide ancillary services.

##### **Stage 4: Transformation**

This is an advanced stage of e-Government which provides a single point of entry for the citizen making government services completely transparent and fully accessible online. It also requires a high degree of ICT integration and well trained staff to handle the services. This stage marks a fundamental shift in the approach to public service delivery from a supplier-oriented system to a customer-oriented system.

#### **5. Main features of Sri Lanka's e-Government policy**

E-Government policy has been designed to achieve the vision of adopting ICT to make government more efficient and effective and to create a citizen centric government. Driven by this vision the policy has addressed the following important aspects that influence the level of success in transforming traditional systems of public service delivery to e-Government.

- Enabling legal environment
- ICT management
- Information lifecycle management
- Standards applicable
- Ownership and responsibility
- Compliance requirements
- Accessibility and service delivery
- Contracts and information asset management
- ICT project continuity
- Procurement and contractual issues
- Intellectual property rights
- Communication interface
- Networking and Connectivity
- Human resource development

## **6. Successful e-Government Practices in Sri Lanka**

Some of the successful e-Government projects in Sri Lanka can be listed as follows.

- The e-Motor Revenue License project introduced in the Western Provincial Department of Motor Traffic (WPDMT) has enabled vehicle owners to renew the annual revenue license in a few minutes or obtain the license by making payments online. In formulating and implementing the e-Motor Revenue License project the WPDMT has collaborated with the Department of Motor Traffic and private sector service providers.
- The project on Digitization of Birth, Marriage and Death Certificates implemented by the Registrar General's Department has enabled residents to obtain a copy of any of the three certificates in a few minutes.
- The e-Human Resource Management project implemented by the Combined Services Division in the Ministry of Public Administration has led to a high degree of efficiency improvement, saving time and resources spent on administering annual transfers of public servants.
- The Department of Immigration and Emigration has adopted ICT successfully to improve efficiency and effectiveness of the Department. In the issue of passports to citizens and in border control activities at the international airport in Colombo the Department has been able to achieve efficiency improvements through ICT integration and training and motivation of staff.

## **7. Conclusion**

The benefits of e-Government such as increased efficiency, transparency, cut down in corruption and increased citizen participation have been achieved to some extent by ICT projects in Sri Lanka. However, a lot more is to be done under the guidelines provided by the e-Government Policy in order to transform the public sector to become more customer oriented and IT driven.

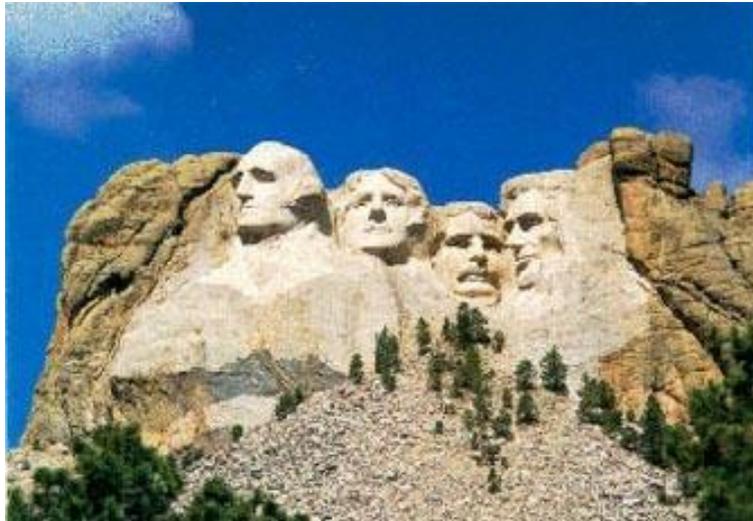
The success of e-Governance depends on the extent to which a planned approach is adopted towards change. Building organizational capacity and creating customer centric organization

culture are necessary preconditions for reengineering of work processes, which is an essential component of ICT integration.

The effectiveness of e-Governance also depends on the citizens' level of awareness of e-Government practices and the extent of citizen participation in e-Governance. Sri Lanka is yet to achieve progress in this respect

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1. e-Government Policies, Concepts and Practices – PIM Lecture Notes



**Three of the four presidents on Mount Rushmore started as surveyors, specifically, George Washington, Thomas Jefferson, and Abraham Lincoln.**

# **CADASTRAL SYSTEM IN KINGDOM OF BAHRAIN AND SRI LANKA LAND TITLING**

**By**

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Survey and Land Registration Bureau (SLRB) is the Bahrain government organization responsible for all surveying & Mapping matters in preparation of Deed Plans, registration and issuing Title Deeds. Two Directorates under SLRB mainly involved in this process are the Survey Directorate and the Land Registration Directorate. Different types of surveying matters are functioning under 3 directorates within Survey Directorate. They are namely Cadastral Survey Directorate (CSD), Topographical Survey Directorate (TSD) and Hydrographic Survey Directorate (HSD). Topographic Survey Directorate is responsible for Mapping & control surveys and Hydrographic Survey Directorate (HSD) is responsible for all Hydrographic Surveying matters of Bahrain.

The Cadastral Survey Directorate administers the survey system primarily to provide accurate identification of boundaries for land tenure purposes and prepare detailed records and publish maps, title deed plans and survey certificates for the benefit of the public, Royal Court and other government agencies. So, CSD carried out all cadastral surveys in the country for preparation of deed plans which required for issuing Title Deeds, preparation of Land Certificates for Building purposes as required by the Municipality, preparation of Certificate of Surveys (COS) to prove the current situation of the land shown in the TD for other organizations such as banks, etc. The Land Certificate (LC) is for supply to the Municipality as an integral part of the building permit which is required before any construction on site. It is for Municipality to ensure that the building is constructed within the demarcated boundary.

## **HISTORY**

Ownership rights in Bahrain are evidenced by a Title Deed. Since 1976 Title Deeds have been in the form of bound book. Center pages of the book are the Deed Plan prepared by CSD and validated by Director of CSD. Early stage of the deed registration of the country has been done with the diagram showing measurements between boundary points and measured dimensions of the diagonals of triangles. As there were no natural features as boundary of lands, straight boundaries have been laid over open lands. Due to the technology and the skilled personnel availed at that time, geometrical diagrams of lands have been considered as deed plans. Therefore this method has been adopted for preparation of deed plans and successfully issued Title Deeds. The extent of the land was not mentioned in the diagram and the area computed from the triangles was mentioned in the deed. In fact land owners do not interest about the area of the land but their interest is the dimensions between boundary points to secure their ownership.

In order to implement a cadastral system in Bahrain, Cadastral Index Maps (CIM) have been created by a special project team known as Land Inventory Project (LIP) operation between 1982-1985 using photogrammetric techniques. All identifiable deed plans held by the land registry have been compiled graphically, and by interpretation of all the abuttal information available into a series of graphics based upon standard map sheets. As a final exercise the records have been digitized to the database as a separate layer depicted in “blue-dashed” lines.

Due to the lack of technically qualified personnel in land surveying, CIM parcels have been surveyed with the available technology without connecting to the national grid. Whenever a new deed plan is required this type of survey has been carried out for preparation of deed plans and new TDs have been issued. With the available qualified personnel in land surveying CIM parcels and other surveyed parcels that have not been connected to the national grid were surveyed and upgraded connecting to the national grid with the accuracy & standards specified for cadastral surveys. Accordingly after completion of the CIM's were updated systematically to reflect new and confirmatory survey until the system of regular issue. When a survey is carried out for a land parcel, surveyor has to ensure that the survey is not affected for all abuttal lands of the subject plot. Whenever the development of the subject plot affected for abuttal plots such development out of the subject plot should be shown in the COS as over development and any encroachment within the subject plot by the abuttal plot should be shown in the COS as an encroachment.

### **GRAPHICAL DATABASE**

There are 3 types of land parcels defined within the database, namely Numeric, Graphic and CIM. All CIM parcels created under LIP are shown graphically blue colored dashed lines. The land parcels surveyed by graphic methods without connecting to the national grid are called Graphic parcels. These graphic parcels are positioned in relation to "hard" topographic detail and shown in Green colored lines. The land parcels with coordinated boundary points (beacons) on the National Grid are called Numeric parcels and shown in Red color with unique beacon numbers. Beacons attached to the parcels will be displayed on the graphic database. Previously unknown CIM parcels are normally identified and located as abuttal to numeric or graphic parcels. Existing CIM parcels are to be deleted from the graphic database when supersede such parcels to graphic or numeric. Numeric parcels and their Beacons are loaded to the database by finalization through SURVEYOR programme which is the surveying software used by the CSD and Private Sector Surveyors who carried out cadastral surveys under CSD.

### **SUB DIVISION**

Every development sub-division requires an approved plan prepared by Town and Village Planning Directorate (T&VPD) or by an approved private sector survey company. The sub-division will be confined within a perimeter survey supplied by CSD and sub-division plots must lie entirely within that perimeter. When the private sector undertakes a sub-division of a parcel, coordinates of the parent parcel for sub-division will be provided by the CSD in case of numeric parcels and previous graphic survey field notes along with the abuttal parcels will be provided for graphic parcels. At the completion of the sub-division job by the private sector, parcel coordinates of the sub divided parcels to be supplied to CSD for updating the records in the database.

### **CONTROL SURVEYS / PERMANENT REFERENCE NETWORK (PRN)**

Major control points have been established all over the country in order to simply establish minor control points, by running a traverse, required for detail cadastral survey work. In recent years several factors have highlighted the necessity of more sophisticated approach to geodetic operations in establishment and maintenance of geodetic control points. As a result, Bahrain Permanent Reference Network (PRN) of six stations that covers all of the readily accessible land areas of the Kingdom has been established in late 2006. At these six GNSS Reference Stations are permanently equipped to receive both GPS and Glonass

satellite signals 24 hours a day and satellite tracking data is then transmitted continuously to the Data Control Centre (DCC) for real time processing. The PRN provides data for both real-time and post-processing GNSS applications. The real-time corrections data is accessible by rover equipment via mobile internet in different formats. An additional station configured as a permanent rover with a standard geodetic antenna, primarily operates as a quality assurance station has been established in the centre of the island for quality assurance purpose.

With this PRN system a Surveyor with one GPS unit is sufficient for establishing control points and detail surveying work. Inter visibility required for receiving differential corrections was solved and the differential corrections are receiving through the selected mobile internet service provider. Surveyors were very happy about this system and they could easily establish controls and conduct detail surveys with single GPS equipment. Private Sector Survey Companies also have given the access to receive differential corrections and the survey process in all fields was carried out with this PRN system. All types of cadastral surveys carried out by both CSD and Private Sector have been expedited with the PRN System and the cost involved in field surveys also reduced.

## **PRIVATE SECTOR INVOLVEMENT IN CADASTRAL SURVEYS**

Public can chose either CSD or Private Sector Survey Company approved by the SD for any type of cadastral survey. In this regard Private Sector Survey companies have been educated on the procedures, standards and regulations related to the cadastral surveys. Approved Survey Company has to make a request from the CSD to open a job related to survey undertaken. Old survey records, coordinates of Control Points required and digital data of the related land parcels are to be obtained from the CSD. Once the job is completed by the Survey Company, final product of the job has to be submitted to the CSD along with the field notes, computations and digital data. A certified copy of the product is given to the Survey Company for issuing to the client after passing and finalizing the job to database.

## **SRI LANKA LAND TITLING SYSTEM**

Title Registration in Sri Lanka was commenced in 1995. Since then Survey Department and Land Settlement Department under the Ministry of Lands & Land Development are involving in the process in preparation of Title Certificates. Register General's Department under the Ministry of Public Administration is responsible for the registration of Titles and issuance of Titles Certificates. During the period of 1995-2006, system for issuing Title Certificates has been carried out by Land Titling & Related Services Project (LTRSP) under the Ministry of Lands & Land Development. Since 2006 the same system is carried out under 'Bimsaviya' programme.

With the past experience it is clear that more than 20 years time will take for the completion of issuing title certificates for the all land parcels in the country. Ministry of Lands & Land Development and Sri Lanka Survey Department is looking for some changes to speed up the current process in preparation of Cadastral Plans for issuing titles. When compared to the statistics of the completed land parcels during the past, it is clear that currant process needs to be expedited. Preparation of deed plans using satellite images or by another competitive technique and use of the individual survey plans prepared by Licensed Surveyors are suggested and being discussed.

At this stage SLSD has to create a Cadastral Index Map for that collection of all individual survey plans available could be incorporated. Most of the deeds registered in the

developed areas have been referred to a survey plan prepared by a Licensed Surveyor. As these plans are not registered along with the deed it is not possible to collect them from the land registry. All these Licensed Surveyors' plans have to collect from the land owners and then could be incorporated in to the CIM. In developed areas such plans could be collected from the relevant local government authority. Satellite Images and Photogrammetric methods could be used to prepare CIM for rest of the land parcels not referred to a Licensed Surveyors plan or any other survey plan. Once the CIM is prepared, CIM parcels having large extent, prepared from satellite images could be used as deed plans for issuing TD. However this type of TD issued has to be upgraded to the numeric system. Legal issues of the changes in extent of the land parcels are to be considered when upgrading to the numeric system. Hence allowable changes in extent could be specified in the TD.

Si Lanka Survey Department (SLSD) is now studying the possibility to incorporate individual plans prepared by Licensed Surveyors for issuing Title Certificates. In prevailing deed registration system of Sri Lanka, deeds are registered without a connected survey plan. Therefore issuing a TD with a connected plan is one step ahead of the prevailing system. But, for this type of parcels in individual survey plans that are not numerically surveyed, their shapes sizes and locations will not be accurately fixed. As a result, although they have legal title based on a Deed Plan produced from previously surveyed by non-numeric methods, the Deed Plan may not truly represent the property. Taken for each isolated parcel this may not appear significant, but when a number of such parcels are in contact with each other, the dimensions for abutting boundary segments do not necessarily agree, even when such segments appear to be defined by existing occupation. There will be some doubt that the title as represented by the Title Deed containing the Deed Plan is correct. Hence landowners may or may not occupying land over which they have title. In addition, Deed plans for adjacent parcels may identify encroachments between parcels that do not in fact exist on ground, or fail to identify encroachments that do not in fact exist on ground.

If each land parcel in the individual Survey plans are agreed with the plans of the adjoining lands in contact each other, future problems could be minimized and such parcels could be easily upgraded to the Numeric System. If we do not consider the ownership of abuttal lands there will be overlaps and gaps between deed plans prepared from individual survey plans. So, proper guidelines have to be given to the Licensed Surveyors for preparation of individual plans to minimize such overlaps and gaps. Then such individual plans prepared by Licensed Surveyors could be considered as deed plans for issuing Titles.

In the current process of Land Titling in Sri Lanka, if the Cadastral Index Maps are prepared before the preparation of cadastral plans it would be simplified the process in both surveying and adjudication. Cadastral Index Maps could be used for the adjudication process before preparation of deed plans. When a survey plan is requested by the land owner for any purpose, then such individual parcel could be surveyed for preparation of deed plan and accordingly CIM parcels could be systematically upgraded. Proper guidelines and procedures have to be introduced for both government and Licensed Surveyors in preparation of such cadastral plans and Survey Department has to maintain and update such records.

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# **Applications of Information Technology in Survey Department Activities**

By

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## **1. Introduction**

E-Government is the use of information and communication technology to enable more efficient, cost-effective and more reliable systems in Government institutions. Survey Department performs irreplaceable tasks to serve the nation as the oldest Department in Sri Lanka. With evolvement of information technology, Survey Department was able to adopt e-government for strengthening and streamlining of traditional processes of the Department. This paper describes couple of such developments done by the Department.

## **2. Documents Management**

District survey offices are located at the District level to fulfill survey requirements of the District. Survey documents (mainly survey plans) are stored at the District survey offices and, each new survey produces a new survey document. District survey offices are having a huge collection of survey documents since 1800 AD. Each District office is having approximately 30,000 survey documents (statutory plans) of different types.

Survey documents are valuable documents and they provide information to the public, administrators, planners and the juridical system of the country. There is no other place or source at the district level to provide information of the survey documents to above parties. All the documents are paper based documents and manual handling of them at the District survey offices is a tedious task. Some documents are issued to the field staff of the Survey Department to carry out field work and, they should be returned after completion of field work. New documents produced by the field staff are also lodged at the District survey offices.

With the growing volume of documents, District survey offices were facing the challenge of maintaining, monitoring and protecting documents. Therefore, it was decided to solve this problem with e-government solution. Following prevailing issues were mainly considered to introduce new systems.

- a) Manual inventory is cumbersome and inefficient in searching information.
- b) Missing documents due to large number of transactions.
- c) Tracking system of documents was inefficient.
- d) Size of documents varies from A0 to A4. Therefore, physical handling of documents to be done with great care and life span of documents is becoming short.
- e) Physical distortions (shrinkage, etc) of the materials (papers) used for survey plans due to humidity and other environmental factors.

Unless a good digital inventory, tracking and storage system is established, above issues cannot be defeated. Followings were considered for introducing new system.

- a) Digital document inventory should consist with all important information related to documents.
- b) Digital indexing of documents for easy referencing.
- c) System should be efficient for tracking documents and making reports and timely decisions.

- d) Creating a database to store information related with transaction of documents.
- e) Scanning of documents and creating an image database.

## **2.1 Automated Documents Inventory and Tracking System**

A system called “Automated Documents Inventory and Tracking System” (ADITS) was developed for digital indexing documents, building a digital inventory, tracking documents, making reports, etc. ADITS is a stand-alone system based on a personal computer. Existing personnel in the District survey offices can operate ADITS after getting a short training. Database components of the system are linked and, referential integrity has been enforced for consistency and security of data. Database is protected with three levels of security systems. Only authorized users are able to change and update information. ADITS database contains information of each and every document available in the District survey office, status of each document, name of officer responsible if it has been issued to field, date issued to field, information about previous issues, etc.

### **2.1.1 Functions of ADITS**

ADITS consists with following main functions.

- a) Produce a delivery note for the issued documents. This delivery note to be signed by the issuing officer and receiving officer.
- b) Produce a receiving note for the documents returned by the field staff. This receiving note to be signed by the receiving officer.
- c) Produce a list of documents chargeable to any field officer.
- d) Showing current status of any document.
- e) Produce a list of documents under any category of survey plans.

## **2.2 Preservation of Survey Documents**

Preservation generally involves transferring data to more reliable and efficient environment so that they are compatible with new technology. Therefore, preservation directly relates to the hardware, operating system and application software. IT technology is constantly evolving. The long-term preservation of scanned images actually constitutes a problem because the hardware and software environments in which the images exist become outdated and obsolete. Therefore, this matter was considered seriously in preservation and selecting software and hardware. If archived documents (images) depend on any specific software, then archived documents may not be accessed with more recent IT technology. Therefore, image file format should be more durable or better suited to long-term preservation. A standard file format is more durable and usable than a non-standard format.

A survey document consists with one page or more than one page. As we have seen, more than 95% of the documents are having more than one page. Survey documents contain important information. Sometimes, information is depicted in different colors and each color has a meaning. Content of the survey document to be interpreted according to the scale of it. Therefore, preservation strategy of the survey documents is not similar to preservation of normal text documents. Considering above aspects, all documents of A3 size were scanned with resolution of 300dpi and 24 bit color. Format of the plan and tenement list is JPEG and PDF respectively.

When deciding a preservation strategy, the best place to start is with the information system itself. This information system should consist with which survey documents have been scanned, where they have been stored, how each image was named, etc. These information are important for several reasons. A database of this type can serve as a metadata

system, from which the necessary metadata can be taken at a later date. Image database is having a relationship with ADITS database to enable further developments.

### **2.2.1 Functions of SurveyImage**

To fulfill all above requirements in preservation of survey documents, software called “SurveyImage” have been introduced. SurveyImage is multifunction software which operates scanner, scan documents, index images, creates relationship with ADITS database, view scanned images, etc at the time of scanning. In addition, SurveyImage provide facilities to see number of pages available in each document, view image of any page, etc.

### **2.3 Productivity Enhancement Through ADITS and SurveyImage**

ADITS and SurveyImage software products provide facility for efficient use of documents and tools for tracking them effortlessly. Better service and timely information can be provided to the officials and normal public with least delay. Physical handling of documents can be minimized and life span of the documents can be improved. Misuse of documents can be avoided and safety will be improved. Scanned images of documents can be used more efficiently and quickly for viewing and extracting data for decision making. Scanned documents can be shared among different parties for efficient use.

## **3. Digital Data Management**

Separate chapter in Department Survey Regulations (DSR) has been introduced to streamline digital data handling in field survey operations and related activities. Regulations and guidelines for collection of field survey data in digital form, manipulation of them, use of them for preparation of digital survey plans, handling of digital survey plans, procedures to incorporate scanned images in new digital survey plans, digital data storage mechanism, etc are described in this DSR chapter. All the supervising officers and surveyors have acquired knowledge required for data collection, manipulation, processing and preparation of survey plans in digital form. Currently, all survey plans are prepared in digital form. Collection of all survey plans in a database will make a path for the national Land Information System which is vital in many applications. Survey Department has already initiated Land Information System (LIS) and part of it is already available in a web site developed by the Department. Tenement lists of 153,883 land parcels and digital survey plans of 131,415 land parcels completed in digital form up to end of December 2010 have been transferred to the databases and available in the web. Low expensive and open source software has been used for the development of LIS. Land Information System will progressively cover entire country.

## **4. Preparation of Tenement List**

Tenement list, a text document which is part of survey document, contains details of land parcels of the survey plan. With the introduction of DSR chapter for digital data management, surveyors prepare tenement list through a software (TLdb) introduced by the Department. Surveyors feed data through TLdb software and gets print out of the tenement list through the software. This procedure automatically assigns unique parcel identification number for each land parcel and store data in a database. Print outs of the tenement lists are also enhanced as they are printed using computers in a unique format. Finally, databases of tenement lists are stored in a central and national database.

## **5. Database for Survey Activities of the Country**

Survey Department carries out various kind of surveys in the country. Almost all kind of statutory surveys in the country are carried out by the Survey Department. Survey Department get requisitions for surveys mainly from Divisional Secretaries, Government

institutions such as Mahaweli Development Authority, Road Development Authority, etc. A survey requisition is issued for each request of survey received. Survey requisition contains location of survey, type of survey, estimated work load of survey, etc. Proper management of survey requisitions is useful to estimate work load in each area and management of resources accordingly. Once survey is completed, survey requisition is updated with actual work load of the requisition, name of the surveyor, plan numbers, etc. Monthly and annual progress reports are also prepared according to the information available in survey requisitions. Therefore, developments are underway to build a database and related software to manage survey requisitions, progress reporting, etc.

## **6. Challenges and Facing Them Successfully**

Of course there is always “the other side” of every story. Will digital systems work? Where would the money come from for the systems? Do we have enough staff to handle this? Are they capable of handling this? Do we have mechanism for sustainability? These were the questions of many people, when the initial interest of digital system was introduced.

With the experience gained during last couple of years, everybody has very positive answers for many of above questions. Digital systems introduced by the Department work very successfully. Budget has been minimized with introduction of open source software, in house development of software and running most of the systems in ordinary personal computers. Staff who handled manual processes are capable to handle same processes digitally. Therefore, staff also get job satisfaction by working with new technology.

Sustainability is an important topic in IT. One of the challenges already realized is sustainability of the systems. A solid foundation must be built, in order to sustain IT related applications. Systems cannot keep going without upgrades. Mechanism should be formed to get user feedback and upgrading should be done accordingly.

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**“If someone feels that they had never made a mistake in their life, then it means they had never tried a new thing in their life”.**

**- Albert Einstien**

**“Believing everybody is dangerous;  
Believing no body is more dangerous”.**

**- Abrahan Lincoln**

**ඉතිහාසගත පිඹුරු**

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මිනින්දෝරු දෙපාර්තමේන්තුව වර්ෂ 1800 දී අගෝස්තු මස 2 වන දින ගාල්ලේදී ආරම්භ කළ දැනට පවතින පුරාණතම දෙපාර්තමේන්තුවයි. මෙම දෙපාර්තමේන්තුව ඇරඹීමේ ආසන්නතම අරමුණ වූයේ මුහුදුබඩ ඉඩම් සිතියම් ගත කර, විකිණීම සඳහායි.

පිඹුරු පත හෝ සිතියම යන වචනය පොදු ව්‍යවහාරයේදී එකම කරුණක් උදෙසා භාවිතා කරනත්, එම වචන දෙකේ විශාල වෙනසක් ඇත. පිඹුරු (Plan) යනු භූමිය මත වූ යම් දුරක් පරිමාණයකට කඩදසියක් මතට ගැනීමෙන් නිර්මාණය වන සැලැස්මයි. මෙහිදී සියලුම භෞතික වස්තු එකම පරිමාණයකට මෙම සැලැස්ම තුළ පෙන්වනු ලැබේ. සිතියම (Map) යනු පිඹුරක් සේම භූමිය මත වූ යම් දුරක් පරිමාණයකට කඩදසියකට ගන්නා ලද සැලැස්මකි. නමුත් මෙහිදී භෞතික වස්තූන් පරිමාණයකට නොව සංකේතාත්මකව මෙම සැලැස්මට ඇතුළත් කර ඇත. (උදා: පාර, පන්සල, තැපැල් කන්තෝරුව, නිවාසය.....)

මෙලෙස පිළියෙල කරන ලද පිඹුරු වල වසර 200 ක විකාශනය මේ ලිපිය මගින් මෙතෙක් පටන් දිගහැරෙනු ඇත. ශ්‍රී ලංකා මිනින්දෝරු දෙපාර්තමේන්තුවේ පළමු පිඹුරු පිළියෙල කරනු ලැබුවේ වර්ෂ 1800 අගෝස්තු 20 වන දින මුල්ලේරියාව ප්‍රදේශයේ ඉඩමක් සඳහායි. එය හිමිකම් පිඹුරු 1 (Title Plan 1) ලෙස අංක කරන ලදී. ඉන් අනතුරුව වර්ෂ 1856 වන විට පිඹුරු 50,000 ක් නිම කරන ලද අතර වර්ෂ 1900 වන විට හිමිකම් පිඹුරු 200,000 නිම කරන ලදී. වර්ෂ 1900 සිට වර්ෂ 1954 දක්වා කාලය තුළ හිමිකම් පිඹුරු 232299 ක් නිම කරන ලද අතර, මේ වන විට නිම කරන ලද සම්පූර්ණ හිමිකම් පිඹුරු ගණන 432299 ක් විය. හිමිකම් පිඹුරු අංක 432299 න් පසු මේ අංක ක්‍රමය යටතේ කිසිදු හිමිකම් පිඹුරක් නිර්මාණය වී නොමැත. මෙම පරාසයට පිටින් යම් පිඹුරු අංකයක් වේ නම් එය සාවද්‍ය හෝ වංචනික පිඹුරක් බව ජනතාව වටහා ගත යුතුය.

වර්ෂ 1934.10.26 දින සිට ඉහත අංක ක්‍රමය අන්තිට වූ අතර ඒ වෙනුවෙන් T අක්ෂරය මුලට යොදා හිමිකම් පිඹුරු අංකනය කරන ලදී. එහිදී TPT 1, TPT 2.....යනාදී ලෙස TPT 29259 දක්වා අංකනය කරන ලද අතර මෙම ක්‍රමය ද 1942.01.16 දිනෙන් පසු අන්තිට වනු ලැබීය. එනම් 1942.01.16 දිනට පසු මේ ආකාර හිමිකම් පිඹුරු නිෂ්පාදනය වී නොමැති අතර , එවැනිකම් තිබේ නම් එය වංචනික හෝ සාවද්‍ය පිඹුරකි.

ඉහතින් විස්තර කළ හිමිකම් පිඹුරු දෙවර්ගයට අමතරව, එක් එක් කාර්යයන් සඳහා විශේෂිත වූ හිමිකම් පිඹුරු කිහිප වර්ගයක් පිළියෙල වී ඇති අතර ඒවා පහත පරිදි වේ.

- 01. අත්කර ගැනීමේ හිමිකම් පිඹුරු - වර්ෂ 1892 සිට වර්ෂ 1912 දක්වා කාලය තුළ පිඹුරු අංක 1 සිට 2669 දක්වා පිළියෙල වී ඇත. මෙය Acquisition TP1 ලෙස අංකනය කර ඇත.
- 02. පතල් කැනීමේ හිමිකම් පිඹුරු - වර්ෂ 1915 සිට වර්ෂ 1940 දක්වා කාලය තුළ පිඹුරු අංක 1 සිට 184 දක්වා පිළියෙල වී ඇත. මෙය Mining Right TP1 ලෙස අංකනය කර ඇත.
- 03. වර්ෂ 1937 සිට වර්ෂ 1938 කාලය තුළ Crown Title Plan, 154 ක් පිළියෙල වී ඇත.

ඉහත හිමිකම් පිඹුරු වර්ග 5 තුළම අංකනය මුළු ලංකාවටම එකක් වශයෙන් අංකනය කර ඇත.

මෙම හිමිකම් පිඹුරු ක්‍රියාදාමය ක්‍රියාත්මක වන අතරතුරදීම රජයේ ඉඩම් වෙන්කිරීම සඳහා මූලික පිඹුරු (Preliminary Plan) නිෂ්පාදනය 1859 වර්ෂයේදී ආරම්භ කෙරිණි. මෙහිදී පළාත් මට්ටමෙන් පළාත ඒකකයක් සේ සලකා අංකනය (PP 250) කෙරුණු අතර 1932 වර්ෂයේදී මෙම ක්‍රමය අන්තිට වන ලදී. නිපදවා ඇති පිඹුරු ප්‍රමාණය 82250 කි.

1932 වර්ෂයේ සිට මූලික පිඹුරු අංකයට මුලින් A අක්ෂරය යොදා අංකනය කරන ලද අතර(PPA 250)එය ද පළාත් මට්ටමින් සිදු කරන ලදී. වර්ෂ 1965 දී මෙම අංකනය යටතේ මූලික පිඹුරු නිපදවීම ද අන්තිට වන ලදී. නිපදවා ඇති පිඹුරු ප්‍රමාණය 18376 කි.

මීට අමතරව මුළු ලංකාවටම බලපාන පරිදි S අක්ෂරය යොදා වර්ෂ 1950 - වර්ෂ 1965 දක්වා කාලය තුළ මූලික පිඹුරු 4998 ක් නිපදවා ඇත. ( S 4998)

1965 වර්ෂයේ සිට මූලික පිඹුරු නිෂ්පාදනය දිස්ත්‍රික් මට්ටමින් අංකනය කරනු ලැබූ අතර, දිස්ත්‍රික්කය හඳුනාගැනීම සඳහා දිස්ත්‍රික් මුල් අක්ෂරය හෝ අක්ෂර දෙක අංකනයට මුලින් යොදාගන්නා ලදී. උදා: මහ 1, කො 1, ම 1..... දැනට මෙම ක්‍රමය දිගටම පවත්වාගෙන යමින් ඇත.

මීට අමතරව ශ්‍රී ලංකාවේ විශාල වශයෙන් තිබූ හේන් මැනීම සිදුවූ අතර එය වර්ෂ 1874 සිට වර්ෂ 1887 දක්වා කාලය තුළ සිදුකර ඇති අතර, අංක 16 සිට 300 දක්වා පිඹුරු නිපදවා ඇත. අංකනය Chena PP 16..... ලෙස වේ.

වර්ෂ 1920 සිට වර්ෂ 1968 දක්වා කාලය තුළ විවිධ මැනුම් සඳහා ද මූලික පිඹුරු අංක 1 සිට 246 දක්වා නිපදවා ඇති අතර ඒවා MSPP 1 හෝ MSP ලෙස අංකනය කර ඇත.

වර්ෂ 1897 අංක 1 දරණ රජයේ මුඩු බිම් පනත එළි දැක් වූ පසු මුළු ලංකාවේම ඉඩම් මැනීම එක් ක්‍රමවේදයකට අනුව ආරම්භ කළ අතර එය ලංකා මැනුම හෙවත් Block Survey ලෙස නම් කරන ලදී. මෙහිදී වගාව අනුවත්, හිමිකම අනුවත් ඉඩම් වර්ග කර එකම වර්ගයට අයත් ඉඩම් එකම කැබැල්ලකට ඇතුළත් කර මැනීමට ලක්කල නිසා මෙම මැනුමට Block Survey ලෙස නම් තබා ඇත.

මෙහි පිඹුරු අංක කිරීම (BSVP හෝ Village Plan) ගම් පිඹුරු (ග.පි) ලෙස පළාත් මට්ටමින් අංක කර ඇත. වර්ෂ 1931 අංක 20 දරණ ඉඩම් නිරවුල් කිරීමේ ආඥාපනත මගින් මෙම මැනුම් වලට අදාළ ප්‍රදේශ වල රජයේ ඉඩම් හා පෞද්ගලික ඉඩම් වෙත වෙනම හඳුනාගෙන, ඉන් අනතුරුව එම ගම් පිඹුරු, අවසාන ගම් පිඹුරු (Final Village Plan) ලෙස එම අංකනයෙන්ම නම් කර ඇත. ( FVP - අ.ග.පි) නිපදවා ඇති පිඹුරු ප්‍රමාණය 8891 කි.

ඉතා විශාල ප්‍රදේශයක් රජයේ ඉඩම් තුළ, ඉතා කුඩා පෞද්ගලික ඉඩම් පිහිටි ප්‍රදේශ තෝරා ඒවා භූලක්ෂණාත්මක මූලික පිඹුරු (Tpoo.PP) ලෙස පිළියෙල කර ඇති අතර මෙහි මුල් පිඹුරු සඳහා යොදාගෙන ඇත්තේ අගලේ සිතියමක වට මායිම සලකුණු කරන ලද පිඹුරකි. මේවා ද ඉහත ඉඩම් නිරවුල් කිරීමේ ආඥාපනත යටතේ නිරවුල් කළ පසු අවසාන භූලක්ෂණාත්මක මූලික පිඹුරු ලෙස (FTP) පළාත් මට්ටමින් අංක යොදා ඇත. නිපදවා ඇති පිඹුරු ප්‍රමාණය 319 කි.

තවදුරටත්, ජනපද, නගර, වාරිමාර්ග ව්‍යාපෘති, සහ වනාන්තර ආවරණය සඳහා ජනපද පිඹුරු, නගර පිඹුරු, වාරිමාර්ග මූලික පිඹුරු සහ වනාන්තර මූලික පිඹුරු ලෙස පිඹුරු නිෂ්පාදනය ද ඒ ඒ අවස්ථාවලදී සිදුකර ඇත.

1881.04.01 දින සිට 1941.05.21 දින දක්වා වූ කාල පරාසය තුළ විටින් විට බදු පිඹුරු (Lease Plan) 6439 ක් නිෂ්පාදනය කර ඇත. (LP 250)

1998 අංක 21 දරණ හිමිකම් නිරවුල් කිරීමේ පනතේ 11 වගන්තිය යටතේ කඩඉම් ප්‍රදේශ ලෙස නම් කරන ප්‍රදේශ වල කඩඉම් සිතියම් පිළියෙල කළ යුතුය. දැනට මෙම පනත යටතේ ලංකාවේ ප්‍රදේශ බෙහෝමයක කඩඉම් සිතියම් හෝ කඩඉම් පිඹුරු පිළියෙල කිරීම ආරම්භ කර පවත්වාගෙන යනු ලැබේ. මේවා අංකනය කිරීම පළාත් සහ දිස්ත්‍රික් යන දෙකම ඒකාබද්ධ වූ ක්‍රමවේදයක් මගින් සිදු කෙරේ. මුල් අංකය පළාත හඳුනා ගැනීමටත්, දෙවන අංකය පළාත තුළ දිස්ත්‍රික්කය හඳුනා ගැනීමටත්, ඊළඟ අංක 4 කඩඉම් සිතියම් අංකය ලෙසත් අංක හයකින් යුත් අංක ක්‍රමයකි.

දැනට ත්‍රියාත්මක කරන කඩඉම් සිතියම් මගින් මුළු ලංකාවම ආවරණය කිරීමට සැලසුම් කර ඇති අතර මෙතෙක් මා කථා කළ පිඹුරු වලට අසාධාරණයක් නොකොට මෙම කාර්යය ඉටු කිරීම සෑම සියළුදෙනාගේම වගකීම හා යුතුකම බව අවධාරණය කරමි.

මිනින්දෝරු දෙපාර්තමේන්තුව වර්ෂ 1800 සිට හිමිකම් පිඹුරු නිෂ්පාදනය කරන ලද අතර 1856 දී පමණ කේන්ද්‍ර පත්‍ර වල පිඹුරු ඇදීම ආරම්භ කරන ලදී. ප්‍රථම භාගය දම්වැල් මැනුම, තලමේස ක්‍රමය වැනි සරල ක්‍රම උපයෝගී කරගෙන ඇත. විකෝණමානය භාවිතයත් සමඟ කේන්ද්‍ර සටහන් තැබීම ආරම්භ වී ඇති අතර, පරික්‍රමණ දිග සහ දිගුණ සටහන් කිරීම මගින් භූමියේ පිහිටීම ඉතා නිවැරදිව මැනුම් කිරීමට ලක්කර ඇත.

එද මෙද තුර පිලියෙල කරන ලද ඕනෑම පිඹුරක් (භූමියේ විශේෂිත වෙනසකට ලක් වී නොමැති නම්) ඕනෑම අවස්ථාවකදී භූමියේ පිහිටුවීමට හැකි තාක්ෂණයක් අප සතුව ඇත. මීට වසර 200 කට පෙර සාදන ලද පිඹුරක් වුවද අද දින භූමියේ පිහිටුවීමට, අපගේ මැනුම් තාක්ෂණය මහෝපකාරී වේ. මෙසේ කිරීමට හැකි වන්නේ ගුණාත්මකභාවයෙන් ඉතා ඉහළ මට්ටමක පිඹුරු නිෂ්පාදනය සහ කේන්ද්‍ර සටහන් තබා ගැනීම තුළයි. මෙය නොසලකා ක්‍රියා කරන්නේ යම් දිනකදී ද, එදින සිට මිනින්දෝරු වෘත්තීය කෙරෙහි ජනතාවගේ විශ්වාසය පළුදු වන අතර, අපට ද අභිමානයෙන් ඉදිරියට යා නොහැක.

මිනින්දෝරු වෘත්තීය විශ්වාසනීයත්වය හා ඉහළ ගුණාත්මකභාවය නිසාම 1895 අංක 16 දරණ සාක්ෂි ආඥාපනතේ 83 වගන්තිය මගින්, මැනුම්පති විසින් පිලියෙල කරන ලද පිඹුරක් නිවැරදි බවට පූර්ව නිගමනය කර ඇත. මෙය ආරක්ෂා කර ගැනීම අප අපගේ ගෞරවය ආරක්ෂා කර ගැනීමයි.

1935 අංක 17 දරණ ඉඩම් සංවර්ධන ආඥාපනතේ විධිවිධාන මගින් දීමනාපත්‍ර ලබා දීම, ඉඩම මැන පිඹුරක් සකස් කිරීමෙන් පසුව සිදු කළයුතු බවට උපදෙස් ලබා දී තිබියදීත් ජනතාව සතුව කිරීම හා දේශපාලන අධිකාරිය සතුව කිරීම අරමුණින්, 1996 දී ජයභූමි දීමනා පත්‍ර පිළිගත්වන ලදී. නමුත් අද එම දීමනා පත්‍ර ලබාගත් අයත්, නිකුත් කළ අයත් යන දෙපාර්තමේන්තු, අතර මැදි මිනින්දෝරු දෙපාර්තමේන්තුවත් අනවශ්‍ය ප්‍රශ්න රාශියකට මුහුණ දී ඇත. මෙය සැලකිල්ලට ගෙන අනාගතයේදී මිනින්දෝරු දෙපාර්තමේන්තුවේ මූලික තාක්ෂණ ක්‍රමවේදයන්ගෙන් බැහැරව ගුණාත්මක බවින් තොර පිඹුරු හෝ පිඹුරු වෙනුවට ආදේශක භාවිතා කිරීමට පෙළඹුන හොත්, එය අපේ කීර්තිය හා ගෞරවය විනාශ කරන කාර්යයක් සේම ගරු අධිකරණ වල ඇති කර ඇති පූර්ව නිගමන අහෝසි කරගැනීමටත්, අවසානයේ ජනතාව ප්‍රශ්නවලට පටලවන ක්‍රියාදාමයක් වන බවත් සිහිගන්වා, එවැනිනක් සිදු නොවේයැයි ජාතියේ නාමයෙන් ප්‍රාර්ථනා කරමු.

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**Three sentences for getting success**

- a) know more than others
- b) work more than others
- c) expect less than others

- William Shakesphere

**If you start judging people you will be having no time to love them.**

- Mother Teresa

# **The Techniques and Vital Applications in Surveying**

by

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The methods used to collect data from land surveys, which involve the measurement of boundaries and preparation of varieties of maps, depend on the reason for the analysis. Collecting surveying data goes back to the measurements gathered from plotting the layout of the Great Pyramid of Giza, of Stonehenge, and for Greek temples and Roman roads. The most ancient and common of the data-gathering methods was measuring land using a simple length of rope (and later chain) with specific distances marked off on this tool. The measurements allowed the ancients the ability to put structures and roads where they desired. Whether using simple tools or 21st-century computer software aligned with satellite imagery, methods for gathering surveyed land data add up to using mathematical points, lines and curves of the surface of the earth.

## **Quantitative Data Gathering**

- Calculations from triangulation---a series of connected triangles that either overlap or join each other---use quantitative data-gathering methods. This data assessment technique requires using a known base-line measurement. This is a preferred method of surveying because it reduces the amount of computations needing taping off for analysis. For example, a single chain of triangles allows for rapid quantitative measurement of a narrow strip of land. To avoid inaccuracies when using the triangulation method for setting measurements, all angles must be more than twenty degrees.

## **Height and Distance**

- Trilateration is an alternative method to triangulation. Useful in data gathering through measuring height and distance of rough terrain, trilateration uses electronic equipment. This technique allows for accurately carrying forward marked positions in a faster method from the collected measurement data.

## **Connecting Points of Land**

- With a series of measured lengths and directions of lines, the traverse technique for surveying land gathers data by connecting points of undetermined positions of land. This allows for adjustment of the route of the traverse line when obstructions like timberlines, swamps, buildings and even heavy traffic areas would impede the calculations. During initial highway surveying, this "open" traverse practice of gathering information from the survey is common. With a known land position, beginning and ending at the same point (the method used to gather the statistics, as in measuring a tract of land), the traverse technique gathers measurements of the perimeter.

## **Leveling**

- Leveling is calculating the vertical distances on a marked-off rod along with a leveling instrument. Permanent objects of a known elevation that is unlikely to change, such as the top of a ridge, become a yardstick for leveling measurements. This application determines the variations of the height of land, and without the yardstick as a data collection tool the process would fail.

## **Radiation**

- Radiation in surveying works from set points of ground locations to the survey area boundary. This information gathering method pairs with a plane table---a device for plotting maps in the field---and after conversion to the required scale, the distances to these boundary points become marks on the survey sheet for analysis. Similarly, radiation surveying allows recording the gathered data from fixed position bearings and distances directly on the ground for later scrutiny.

## **LAND SURVEYOR DESCRIPTION**

A land surveyor is a person trained to make measurements of the Earth's surface, and present such information in a variety of formats. Land surveyors belong to a larger category of surveyors--people responsible for studying land, airspace and bodies of water--and are instrumental in the field of geospatial information.

### **Main Duties**

- Land surveyors--taking equipment such as measuring tape, automatic levels with tripods, and marking paint with them--visit the area they wish to study. They take note of where the area is, what it looks like, and what is there. They also use legal records and evidence of previous boundaries. The information they gather is then used to prepare maps and reports, or include the data in legal documents and deeds. The work of land surveyors is important for determining aspects of real estate such as houses and lawns, or municipal boundaries on a local, state and national scale.

### **Survey Mapping Technicians**

- In some cases, survey mapping technicians accompany land surveyors. These are people trained to assist land surveyors in performing duties such as carrying surveying equipment, making sketches and taking notes of the information being gathered. They also use brush axes to move bushes from sight lines, or stick stakes in the ground of area being surveyed.

### **Land Surveyor vs. Cartographer**

- The term "land surveyor" is often interchanged with "cartographer." The latter term is used generally for people who make maps. That, however, is just one of the formats that surveyors rely on for presentation of their studies. Relating to mapping duties is the growing use of Geographical Information Systems (GIS), which is a database management system for geographical data to be transformed into digital maps.

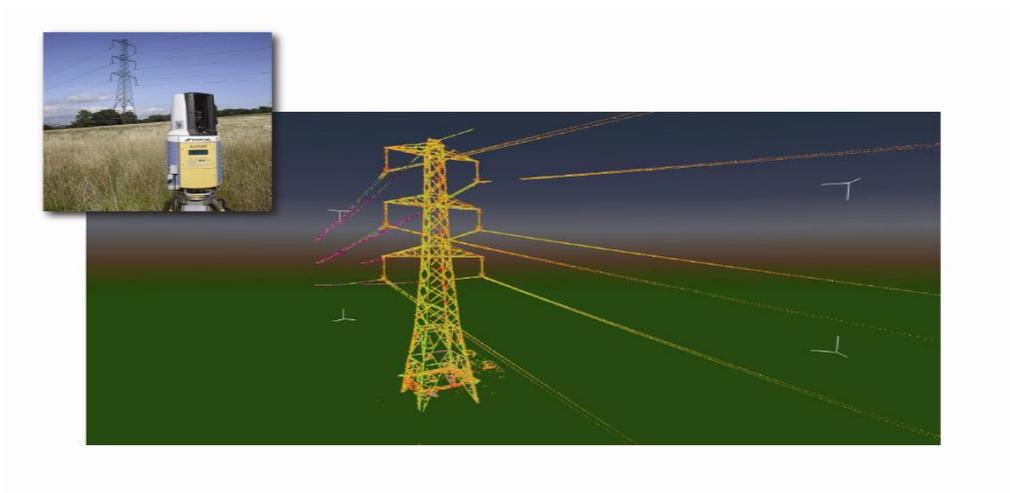
## Education

- With the advance of technology--particularly the advent of GIS--formal training has become increasingly important. Aspiring land surveyors can choose to attend a community college or technical school for a one-year certificate/diploma or two-year associate degree in surveying technology, or get a bachelor's degree from a four-year college or Sabaragamuwa university.



**3D laser scanning Process.**

*Image below is a 3D perspective view of a pylon scanned from over 150m away at 2mm*



## Resolution

Laser scanning (Terrestrial laser scanning / LIDAR) enables the rapid collection of highly detailed point clouds over the area of interest. Surveys Gwalia uses the Topcon GLS-1500 scanner that is equipped with a 2 megapixel camera enabling true colour rendering of the

survey data accurate to 4mm on targets up to 150m away, and a maximum range of 330m. We have recently researched solutions for automatically converting laser scan point clouds into maps of geological joints and fractures that can then be plotted in traditional stereonets for geotechnical design and modelling.

#### **Other applications for laser scanning include:**

- Quarry stockpile volume estimates
- Coastal erosion studies
- Geological structure mapping of quarries for structural analysis
- As-built surveys of bridges and civil structures
- 3D models of heritage buildings combined with GPR to investigate internal wall properties
- Forensic science/collision investigations for police and transport authorities
- Typographical surveying
- Ports, harbour and water course modelling
- Erosion monitoring
- Archaeological site mapping
- Detailed interior and exterior scans of buildings for microgravity terrain corrections, building elevations and 3D fly-through.

#### **Measured Building Surveys**

Building plans, elevations and sections are produced where accurate representation is required for design and prior to renovation or alteration. It is particularly valuable where several floor levels are to be overlaid: our rigid grid system enables the structural elements to be confirmed from basement to roof level.



Dealing with boundary disputes

Where disputes arise over boundary location, we undertake the survey of existing physical features on or near the disputed area, relating this to the features appearing on Title or Deed Plans. All this can be located on the National Grid [by GPS observations].

Reference-Internet

# Geo Spatial Data Provision and User Requirements

K.K.B.N.Fernando  
Senior Supdt. of Surveys

## 1.0 Introduction

Sri Lanka Survey Department is the National Mapping Agency in Sri Lanka, and is responsible for provision of topographic mapping products (Geo Spatial Data) for the whole territory of the country. Increasingly its activities and products in Geospatial market are being challenged by constantly changing user requirements, technological advancements, diverse product requirements and emerging new entrants (e.g. Private Companies, Urban Development Authority, Water Supply and Drainage Board, etc.). One of important strategies for Survey Department is to provide basic fundamental dataset relevant to a variety of users who then maintain their own data based on the basic fundamental dataset. Under this environment, Survey Department needs to adopt an innovative system. This article is discussed the problems faced by Survey Department in provision of Geo Spatial Data and analysis of user requirements.

## 2.0 Problems in Geo spatial data provision

There are some problems in provision of spatial data in Survey Department as follows:

- Supplying of digital data is done by CD-ROMs. Therefore users have to go to head office of Survey Department located in Colombo. Sometimes they have to spend two or three days for collecting their requests.
- Due to the insufficient budget and use of manual methods, geo spatial data updating cycle is not properly working. Therefore department faces a problem of issuing updated data to the users.
- As a government agency Survey Department has to spend large amount of money for data collections. Hence price of the data is high.
- Officers who engaged on digitizing of existing maps are not well trained officers. Therefore it is very difficult to maintain the accuracy of the data.
- Aerial photographs cannot be issued without the permission of the Defence Ministry. Users have to face difficulties to get the permission from the Defence Ministry.

Comments on Survey Department's data are collected from the questionnaires. 10 out of 16 user organizations gave their comments such as: out dated data, less accuracy, cost, etc. Figure1 shows the comments on Survey Department's data.

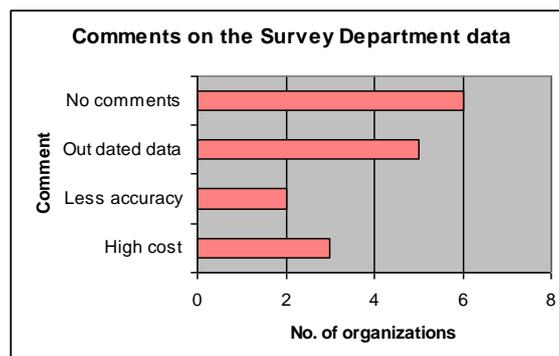


Figure 1: Comments on Survey Department data

### **3.0 User requirements**

Major user requirements collected from the field survey are summarized as follows:

- Most of the users need both 1:10000 and 1:50000 data. These data are derived using different methods and stored in separate databases. Therefore these two datasets do not have consistency and when they are overlaid, they do not match each other. Users always complaining about data inconsistency. Therefore Survey Department needs to prepare a multiple representation database with automatic updating propagation.
- Users expect on-line availability of data through internet. It leads to the establishment of NSDI and clearinghouse concept.
- Users need updated data from time to time. Hence Survey Department needs to revise the topographic data updating process with newly defined recycling period according to the user requirements.
- There is a huge demand for the elevation data from Digital Elevation Model (DEM).
- Every user expects to have spatial data available in the department to be in certain level of accuracy limit.
- Users need easy visualisation ability of data and also need to overlay raster images with vector data layers.
- There is a requirement for development of metadata.
- Customers want data of selected area of coverage as their requirements.

### **4.0 Gaps between user requirements and the current topographic data supply**

- Data provision in hard copies or CDs only and issuing data delayed due to physical take over process - Data provision should be downloadable from networks, particularly to address emergency and management of natural calamities.
- Limited customer oriented services – Data distribution mechanism should be customer oriented to guarantee better satisfaction.
- Unorganized metadata preventing exploration and discovery of data – It is needed store metadata.
- Insufficient trained staff to handle advance tools and techniques – Trained staff is needed to improve data management practice to speed up the in data maintenance and distribution process.
- Unorganized data distribution network – It is needed digital data distribution through the District Survey Offices.
- Data provision in quadrangle format only – It is needed to decrease supplying of unwanted data using Geo-ICT.

### **5.0 SWOT Analysis**

SWOT Analysis is an effective way of identifying strengths and weaknesses, and of examining the opportunities and threats we face. The SWOT analysis is an extremely useful tool for understanding and decision-making for all sorts of situations in business and organizations. SWOT is an acronym for

Strengths, Weaknesses, Opportunities, Threats. SWOT analysis can be used to situation analysis. It is very useful to look in to both external and internal environment, and it enables to make comprehensive and critical current status review. The following SWOT matrix shows the strength and weakness of Survey Department with respect to the internal environment of the system and the opportunities and the threats as they relate to the external environment of the system. See following table for SWOT matrix.

		EXTERNAL FACTORS	OPPORTUNITIES	THREATS
		INTERNAL FACTORS	<ul style="list-style-type: none"> <li>• Could develop new products</li> <li>• Government support.</li> <li>• End users respond to new ideas.</li> <li>• New specialist applications.</li> <li>• Conduct a business process analysis.</li> <li>• Can get financial support from other organizations</li> </ul>	<ul style="list-style-type: none"> <li>• Legislation could impact.</li> <li>• Possible negative publicity.</li> <li>• Some other organizations are doing same work.</li> <li>• Decreasing annual budget.</li> <li>• Decreasing market for analogue products.</li> </ul>
<b>STRENGTHS</b>	<ul style="list-style-type: none"> <li>• Right products, quality and reliability.</li> <li>• Better product life and durability.</li> <li>• Power to regulate producing, maintaining and dissemination of spatial data.</li> <li>• Large collection of topographic data.</li> </ul>	<ul style="list-style-type: none"> <li>• Upgrade topographic database using modern technologies in order to meet user requirements.</li> <li>• Increase the revenue by producing additional products.</li> </ul>	<ul style="list-style-type: none"> <li>• Increase the geo-information production using efficient Geo-ICT technologies.</li> <li>• Increase the market producing digital data.</li> </ul>	
	<ul style="list-style-type: none"> <li>• Customer requirements not known.</li> <li>• No direct marketing experience.</li> <li>• Limited budget</li> <li>• need more staff</li> <li>• Staff needs training.</li> <li>• Need new instruments, new technology.</li> <li>• Need redesigning of processes and systems.</li> <li>• Slow delivery time.</li> <li>• Unable to supply data on customer demand.</li> </ul>	<ul style="list-style-type: none"> <li>• Train staff for the new technology.</li> <li>• Manage and improve work processes.</li> <li>• Improve the production considering user demand.</li> <li>• Out sourcing.</li> </ul>	<ul style="list-style-type: none"> <li>• Shorten delivery time for the products and services.</li> <li>• Redesign work processes in data production, maintenance and dissemination.</li> </ul>	

## 7.0 Conclusion

From information collected from field surveys, it was summarized the gaps between user requirements and the current topographic mapping for the fundamental datasets in Survey Department. To supply fundamental data (Geo Spatial Data) on the user requirements it is needed to reorganize the system architecture of Survey Department. SWOT analysis matrix gives an idea of how Survey Department can improve processes and productions.

**Methods of Geoid Modeling**  
**By**  
**D.G. Suranimala, Registered Licensed Surveyor**

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**Abstract**

Successfully correlating the combination of *absolute heights* and the elusive precise *Geoid* (of 2cm) is discussed here, which are matters of interest with Geodesists for several decades. The latest satellite information technology has proved it to become a reality to unbelievable quality and standards. Even though there are advanced satellite based scientific applications, we still have to consider the conventional methods until the knowledge passes to our countries.

**Introduction**

It may be appropriate to start from the basics of very specialized field in Geodesy as to keep your attention focused throughout the article.

What is **Geoid**?

**Geoid** is *“The hypothetical surface of the Earth that coincides everywhere with mean sea level and is perpendicular, at every point, to the direction of gravity”*.

The geoid is used as a reference surface for astronomical observations and for the accurate measurement of elevations on the Earth’s surface.

Yes....simple questions to most of us... but keeping Geodesists awake at night are follows

- What is the height of a natural or man made point on the surface of the earth?
- How accurate can we know a height?
- Where will rivers overflow if this region is flooded?
- How fast are heights changing?

With solutions to above it happens to consider dominant *height systems* that help to analyze the situation. They are called as follows

- **Orthometric:** “Height above mean sea level” depicts on most topographic maps helps 99% to tell which way water flows.
- **Ellipsoidal:** Almost exclusively from GPS and unable to determine water flow.
- **Dynamic:** Directly proportional to potential energy, exactly deciding the way water will flow

These orthometric and dynamic heights are quite based on vertical datum of countries by which the local geoids are indirectly represented. Published vertical datum of individual countries usually has differences approximating to global geoid. This means Global and local geoids differ in their origin: (different equipotential levels) global geoids consider only the long and middle-wave part of the earth’s gravity field, whilst local geoids also consider the short-wave part of the gravity field.

## Methods of Geoid Modeling

Local geoid models are calculated mainly to cater local engineering projects, cadastral surveying, planning, feasibility studies and etc. The desired models can only be developed using field measurements. They offer centimeter accuracy over several hundred kilometers, with high resolution.

While generating Geoid models there are some commonly used methods as follows:

1) **Astro-Geodetic method:** Profiles of  $N$  (**undulation**) values are calculated by comparison of positions determined geodetically (referred to local ellipsoid) and astronomically (referred to geoid) through computation of the deflection of the vertical at each point. A relative accuracy of a few meters is achievable but the method is difficult and expensive to undertake, hence it is no longer used in practice.

2) **Geopotential models:** These models are derived from a combination of satellite and terrestrial data, using high degree spherical harmonic series expansions to evaluate  $N$  values relative to geocentric ellipsoids. With the advent of satellite based technology revolution help derive precise geoid models having cm accuracies. This method is very convenient to use and therefore keep constantly improving.

3) **Geometric method:** A local representation of the geoid is obtained according to this method, usually at points which have both leveled (orthometric) and derived ellipsoidal (GNSS-derived) heights.  $N$  values at other points are then linearly interpolated. The achievable accuracy is much dependent on the number of common points and the smoothness of the geoid, but the method is very easy to implement and therefore commonly applied in practice.

4) **Gravimetric method:** This method utilizes Stokes' integral and requires terrestrial data in the vicinity of the points at which the geoid is to be evaluated. A relative accuracy of a few cm can be achieved where good **gravity data coverage** is available, making this the potentially most accurate geoid determination method.

The above last two methods are further analyzed briefly comparing the important factors. Usually combining GPS positioning with orthometric heights results in the *Geometrical Geoid*, whose undulations are given as the ellipsoidal (GPS-determined) heights minus the orthometric heights. On the other hand, surface gravity observations supplemented by geodetic levelling can be used to construct the so-called *Gravimetric Geoid*. As a matter of fact these techniques are not independent, since both make use of a density hypothesis within the Earth.

Here the geoid formation can be determined in two different ways, both of which depend on the density of distribution of mass. Hence, there is a hope that in the near future these two techniques can be combined, which will lead to an improvement of density distribution modeling of the Earth upper-most zone, resulting a more realistic 3-D density formation which can change the geoid by few decimeters.

The magic accuracy of 2cm in the determination of Gravimetric geoid – not yet realized in mountainous terrain- requires not only precise surface gravity observations but also accurate theories and related numerical codes for geoidal height computations.

## Key Points useful in creating Geoid models:

- Establishing **0** or **1** order geodetic network generating precise **Ellipsoid model** connecting Global network if possible.
- Ellipsoidal heights should be classified according to the derived accuracies.
- Geodetic levelling of desired stations and applying necessary geopotential corrections.
- Densification of the area by additional GPS/Level stations
- If possible combining all the gravity stations and surveys applying concerned gravity corrections.
- Utilizing the existing digital elevation model or DTM
- Analyzing Data from the available global geopotential models. (EGM2008)
- Structure design according to the computation model.
- Mapping the geoid heights and detection anomalies.
- Applying solutions to geoid anomalies.
- Design additional interpolation structure for geoid heights of specific areas.
- Building up the computer programs as per the mathematical 3D surface fitting strategies.
- Generating undulation model as per the requirement.
- Evaluation by checking field observations for ellipsoidal and orthometric heights.
- Model Validation by graphical and quantitative analysis.

*(It's quite pleasing and gratifying when considered the admirable success of a team of Sri Lankan Surveyors who create a vibrant well correlated exciting Geometric Geoid model in middle-east region where I am personally proud to be one of them.)*

### "About the Author"

Author is from T8 B batch of trainee Surveyors at the ISM between 1976-1978. He obtained the Diploma in Surveying with 1st class honors and became 1st in the batch. He has worked in the Survey Department from 1978-1988 and then from 1991-1992. Pioneered in local Geoid introduction in **Middle-east**. Presently he is a Senior Surveyor at the Centre for GIS, Doha , Qatar .

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**“If you are born poor it’s not your mistake.  
But if you die poor it is your mistake”**

**- Bill Gates**

**ආයතනයන්හි “ශ්‍රමික සම්බන්ධතා”**  
**ඒ.ලෙස්ලි හේමන්ද**  
**මිනින්දෝරු අධිකාරී**

වර්තමානයේ ශ්‍රී ලංකාවේ බොහෝ ආයතනයන්හි දැකිය හැකි වැදගත් ලක්ෂණයක් වනුයේ ශ්‍රමිකයන් හෙවත් සේවකයන් වෘත්තීය සමිති වශයෙන් සංවිධානය වී තිබීමයි. මෙම සේවක සංවිධාන සමග ආයතන වල කළමනාකාරිත්වයට (ආයතනයක ප්‍රධාන විධායක නිලධාරීන්) විවිධ කාරණා සම්බන්ධයෙන් අන්තර් ක්‍රියා කිරීමට සිදුවේ. මෙම අන්තර් ක්‍රියාකාරකම් පද්ධතිය “ශ්‍රමික සම්බන්ධතා” ලෙස සලකන අතර මෙය සේවා මංඩල කළමනාකරණයේ වැදගත් කාර්යයකි. මෙහිදී “සේවකයන්” යන පදයෙන් අදහස් කරන්නේ ආයතනයන්හි කළමනාකරණ නොවන සේවාදායකයන් පිරිසය.

වෘත්තීය සමිතියක් මගින් නියෝජනය වන්නේ සංවිධානාත්මක වූ සේවක පිරිසකි. සේවකයන් වෘත්තීය සමිතියක් ලෙස නියෝජනය වන්නාවූ අවස්ථාවල සේවකයන් හා ආයතන කළමනාකාරිත්වය අතර ජනිතවන සියළුම අන්තර් ක්‍රියාකාරිත්වයන් “ශ්‍රමික සම්බන්ධතා” ලෙස නිර්වචනය කළ හැකිය. යම් ආයතනයක සේවා නියුක්ත සේවක සමූහය හා ආයතන කළමනාකාරිත්වය අතර සේවා නියුක්තියට අදාලව විවිධ කාරණා මත ජනිත වන්නාවූ සියළුම අන්තර් ක්‍රියාකාරකම් මින් අදහස් වේ.

යම් ආයතනයක කළමනාකාරිත්වය සහ එක් එක් සේවකයන් අතර පෞද්ගලිකව (තනි තනිව) ඇති වන අන්තර් ක්‍රියාකාරිත්වයන් හඳුන්වනු ලබන්නේ “සේවක සම්බන්ධතා” වශයෙනි. සේවක සම්බන්ධතා වලදී කළමනාකාරිත්වය සේවකයන් සමග සම්බන්ධ වනුයේ සාමූහික වශයෙන් නොව තනි තනිවමය. සාමූහික වශයෙන් සේවකයන් සමග කටයුතු කිරීමක් දැකිය හැක්කේ “ශ්‍රමික සම්බන්ධතා” වලදීය.

යම් ආයතනයක් තුළ වෘත්තීය සමිතියක් / සමිති ඇත්නම් එම ආයතනයේ කළමනාකාරිත්වය මනා ශ්‍රමික සම්බන්ධතා පවත්වාගෙන යෑම අත්‍යාවශ්‍ය වන අතර මනා සේවක සම්බන්ධතා පමණක් පවත්වාගෙන යෑම ප්‍රමාණවත් නොවන බව දැඩි සැලකිල්ලට ගතයුතු කරුණකි. ශ්‍රමික සම්බන්ධතා වූ කලී වෘත්තීය සමිතියක් මගින් නියෝජනය වන නියමිත සේවක කණ්ඩායමක් සහ සේවායෝජකයන් නියෝජනය කරණ කළමනාකරුවන් අතර අවිච්ඡින්න සම්බන්ධතාවයකි. ආයතනික අරමුණු හා පරමාර්ථ මුදුන්පත්කර ගැනීම සඳහා කළමනාකාරිත්වය සහ සේවකයන් අතර ඇතිවන සම්බන්ධතා අත්‍යාවශ්‍යය. එවැනි සාමූහික සම්බන්ධතා වලදී පහත සඳහන් කරුණුද අන්තර්ගත වේ.

- වෘත්තීය සමිති සමග මනා සම්බන්ධතා ඇතිකර ගැනීම.
- සේවකයන්ට අදාල පඩි, වැටුප්, දීමනා, වැඩ කාලය, නිවාඩු සහ වැඩ කිරීමේ අනෙකුත් තත්වයන් ගැන වෘත්තීය සමිති සහ කළමනාකාරිත්වය අතර සාමූහික කේවල් කිරීම.
- සාමූහික ගිවිසුම් වලට එළඹීම, අදාල ගිවිසුම් අර්ථනිරූපණය හා පරිපාලනය.
- කාර්මික ආරවුල් ඇතිවීම වලක්වාලීම සහ ඇතිවූ ඒවා සමනයට පත්කිරීම.

ශ්‍රමික සම්බන්ධතා ස්ථිතික හෙවත් වෙනස් නොවන සංකල්පයක් නොවේ. එය ගතික සංකල්පයකි. රටක ආර්ථික, සමාජයීය සහ දේශපාලන පරිසරයන්හි වෙනස්කම් සමග වෙනස්වන සංකල්පයකි. “ශ්‍රමික සම්බන්ධතා” සේවකයන්, කළමනාකරුවන් සහ සේවායෝජකයන් එකට එකතුවී සාමූහිකව සුභදව කටයුතු කිරීමේ කලාවකි.

ශ්‍රමික සම්බන්ධතා වලට ප්‍රධාන අරමුණු කිහිපයක් ඇත.

❖ **ශ්‍රමික සාමය ඇති කිරීම හා වර්ධනය**

වෘත්තීය සමිති සහ කළමනාකාරිත්වය අතර ආරවුල්, මතභේද, ගැටුම් යනාදිය නොපවතින තත්වයක් මින් අදහස් වේ. සැබවින්ම මෙය නොසන්සුන්තාවය නොමැති සහ වැඩ වර්ජන, පිකටින් හා සෙමින් වැඩකිරීම යනාදී වෘත්තීය සමිති ක්‍රියාමාර්ග දැකිය නොහැකි මෙන්ම කළමනාකාරිත්වය සහ වෘත්තීය සමිති අතර හිතෙහි සම්බන්ධතාවක් දැකිය හැකිය.

❖ **ශ්‍රමික ප්‍රජාතන්ත්‍රවාදය ඇති කිරීම හා වර්ධනය**

මින් අදහස්වන්නේ වන්නේ වෘත්තීය සමිති වශයෙන් සේවකයන් සංවිධානය වීම පිණිස ඇති ඉඩ ප්‍රස්ථා නොවැලැක්වීමත්, සේවකයන්ට බලපාන විවිධ කළමණාකාරිත්ව තීරණ ගැනීමේදී වෘත්තීය සමිති සහභාගිත්වය පැවතීමත්ය.

❖ **මනා සේවක - කළමණාකරන සම්බන්ධතා පැවැත්වීම හා වර්ධනය**

ආයතනයක වෘත්තීය සමිති සහ කළමණාකාරිත්වය අතර ආරවුල් හා ගැටුම් පැන නැගීම වලක්වාලමින් හිතෛෂීභාවය සහ සහයෝගය රැකෙන පරිදි අන්තර් ක්‍රියාකාරිත්වය පවත්වාගෙන යෑම.

❖ **ශ්‍රමික සම්බන්ධතාවල වැදගත්කම**

ආයතනයක් තුළ හිතෛෂී හා සහයෝගී ශ්‍රමික සම්බන්ධතා ජනිතවී නොමැති නම් විවිධ වෘත්තීය කරුණු සම්බන්ධයෙන් වෘත්තීය සමිති හා කළමණාකාරිත්වය අතර ගැටුම් හා අර්බුද පැනනගී. මේ නිසා ශ්‍රමික නොසන්සුන්තාවය ජනිතවී ශ්‍රමික සාමය බිඳවැටී යයි. මෙහි ප්‍රථිඵලයක් වශයෙන් බොහෝ විට මතු සඳහන් අනිටු ප්‍රතිවිපාක ඇතිවේ.

- සේවක විත්ත දෛර්‍ය හීනවීම.  
(උදා : සේවකයන් වැඩිපුර නිවාඩු ගැනීම, ආයතනයේ පොදු කටයුතු සඳහා දායක නොවීම, රැකියා හැර යෑමට උනන්දු වීම ආදී.....)
- ආයතනික දේපලවලට හානි සිදුවීම.  
(උදා : විදුලිබල මණ්ඩලය, දුම්රිය දෙපාර්තමේන්තුව වැනි ආයතන වල වැඩවර්ජන ආදියවලදී සමහර අවස්ථාවල විදුලි ජනක යන්ත්‍රවලට හානිසිදුව ඇති අවස්ථා, දුම්රිය එන්ජින්, මාර්ගය, විදුලි සංඥා ආදියට හානි සිදුව ඇති අවස්ථා අනාවරණය වී ඇත)
- සම්පත් අපතේ යෑම  
(උදා : මිනින්දෝරු දෙපාර්තමේන්තුවේ රජයේ මිනින්දෝරුවන්ගේ දීර්ඝකාලීන වැඩවර්ජනයක් පසුගිය අවධියක තිබිණි. එහිදී මැනුම් උපකරණ අභාවිතව තිබීම, මැනුම් සහායක සේවකයන් රාජකාරි විසුක්කවීම හා දෙපාර්තමේන්තු වාහන අභාවිත වීම වැනි සම්පත් අපතේ යෑම් සිදුවී ඇත.)
- ශ්‍රම ඵලදායිත්වය පිරිහීම සහ සමස්ථ ආයතනික කාර්යක්ෂමතාව හා ඵලදායිත්වය පිරිහීම.

මෙවැනි අහිතකර තත්වයන් අදාළ ආයතනයට පමණක් නොව සමස්ථ රටටම දැරිය නොහැකි හානියක් වනු ඇත.

උදා : දුම්රිය වැඩවර්ජනයකදී, දහස් ගනන් සේවකයන්ට සේවා ස්ථානවලට යෑමට අපහසු වීම, මෙම දහස් ගනන් ජනතාව විකල්ප වාහන භාවිතය නිසා මාර්ග වල වාහන තද බදයක් ඇතිවීම, දුම්රිය මගීන් කෙරෙන තැපැල් සේවා ඇත හිටීම, දුම්රිය මගීන් කෙරෙන බනිජතෙල් ප්‍රවාහනය අඩාල වීම ආදිය නිසා හානිකර තත්වයන් ඇතිවිය හැක.

ආයතනයක් මනාව පවත්වාගෙන යාමටත්, එම ආයතනය අපේක්ෂා කරන ඉලක්කයන් වෙත ළඟාවීමටත් සේවකයන්ගේ සහාය අත්‍යවශ්‍ය දෙයකි. ආයතන කළමණාකාරිත්වය වෘත්තීය සමිති සමග මනා ශ්‍රමික සම්බන්ධතාවක් පවත්වාගෙන යන්නේ නම් ආයතනයේ අභිවර්ධය සඳහා අවශ්‍ය සේවක සහාය වෘත්තීය සමිති මගින් තහවුරු කරනු ලැබේ.

ශ්‍රමික සාමය ජනිත කිරීම, සාමූහික ගිවිසුම් ඇතිව නිශ්චිත කටයුතු කිරීමට හැකිවීම, සේවකයන්ට සාධාරණව සැලකීම තුලින් ඔවුන්ගේ තෘප්තියඇති කිරීම සහ ඉහල ඵලදායිත්වය ඇති වීම යනාදී යහපත් ප්‍රථිඵල මනා ශ්‍රමික සම්බන්ධතා නිසා උද්ගතවේ. එසේම මනා ශ්‍රමික සම්බන්ධතා, ආයතනයක වෘත්තීය සමිති සහ කළමණාකාරිත්වය අතර අන්‍යෝන්‍ය සම්බන්ධය හා විශ්වාසය ඇති කරයි. මෙය සැබවින්ම සාර්ථකත්වය සඳහා කැපී පෙනෙන අන්දමේ ආශීර්වාදයකි.

මගේ දැනීමේ හැටියට ශ්‍රී ලංකා දුම්රිය දෙපාර්තමේන්තුව මහජනයාට එදිනෙදා අත්‍යවශ්‍ය සේවයක් සපයන විශාල මෙන්ම විවිධ සේවක කණ්ඩායම් සේවයේ යෙදෙන රාජ්‍ය ආයතනයකි. මෙම ආයතනය තුළ වෘත්තීය සමිති සියයකට ආසන්න ප්‍රමාණයක් පවතී. ඒවා සමග මනා “ශ්‍රමික

සම්බන්ධතා” පැවැත්වීම සඳහා ආයතන ප්‍රධානියා (දුම්රිය සාමාන්‍යාධිකාරී) ගේ සෘජු පාලනය යටතේ “සේවක සම්බන්ධතා” ශාඛාව වශයෙන් වෙනම අංශයක් ස්ථාපිත කර ඇත. එම ශාඛාවේ කටයුතු ශ්‍රමික සම්බන්ධතා සඳහා සීමාකොට එම කටයුතු නිබඳ ආයතන ප්‍රධානියාගේ අවධානයට ලක්කෙරේ. දුම්රිය දෙපාර්තමේන්තුව අයත් වනුයේ ප්‍රවාහන අමාත්‍යාංශය වෙතයි. දුම්රිය දෙපාර්තමේන්තුව විෂය භාර අමාත්‍යවරයා හා අමාත්‍යාංශ නිලධාරීන් එම දෙපාර්තමේන්තුවට අදාළව “ශ්‍රමික සම්බන්ධතා” සඳහා අමාත්‍යාංශයේ සහකාර ලේකම් (කාර්මික සබඳතා) වශයෙන් තනතුරක් ස්ථාපිත කොට ඇති අතර එම තනතුර සඳහා පත් කරනු ලබන්නේද ප්‍රධාන වෘත්තීය සමිති ක්‍රියාකාරී රාජ්‍ය නිලධාරියෙකි. ඒ අනුව රජය පවා “ශ්‍රමික සම්බන්ධතා” හි ඇති වැදගත්කම පිලිගන්නාවූ යහපත් ප්‍රවණතාව මෙයින් පිළිබිඹු වේ.  
 (මෙම ලිපිය සැකසීමේදී සමහර කරුණු පොත පතින්ද සපයා ගැනිනි.)



**Two Surveyors go on a camping trip, set up their tent and fell asleep.**

**Some hours later, one Surveyor wakes his friend. "look up at the sky and tell me what you see."**

**The other Surveyor replies, "I see millions of stars."**

**"What does that tell you?"**

**The other Surveyor ponders for a minute.**

**"Astronomically speaking, it tells me that there are millions of galaxies and potentially billions of planets.**

**Astrologically, it tells me that Saturn is in Leo.**

**Time ! wise, it appears to be approximately a quarter past three.**

**Theologically, it's evident the Lord is all-powerful and we are small and insignificant.**

**Meteorologically, it seems we will have a beautiful day tomorrow.**

**What does it tell you?"**

**The first Surveyor is silent for a moment, then speaks.**

**"Practically...Someone has stolen our tent".**

# **A challenging task ahead for National Mapping Organizations: On-demand web mapping with vector representation**

**By**

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## **1. Introduction**

With the rapid development of web technology, there is a growing tendency to view and query maps in computers, personal digital assistants (PDAs) and mobile devices. One of the major drawbacks in the existing technology for using maps over web is that users do not have the ability to view the maps at different scales while zooming in and zooming out the map with the data content dynamically selected based on the chosen scale as a consequence of zooming operation. Presently, the technique used in the web to display maps is based on raster representation of spatial data stored in series of images of the same area with different resolutions. When the user starts zooming operation, map retrieves static information of images stored using spatial indexing (basically with quad-tree data structure), which enables fast retrieval of data. In addition, most of the national mapping organizations still maintain conventional map series at fixed scales, which users somehow have to utilize although information containing on such maps does not serve to fulfil the exact user requirements. The ideal representation of maps on demand should be capable of dynamically selecting the data content on display on vario-scales with applying different colours, fonts and symbology according to user requirements and analysing data based on spatial queries. These capabilities lack in raster data representation. Therefore, On-demand web mapping with vector data representation is the technique, which has the potential to address above drawbacks because of the reason that vector data are more intelligent than raster data, especially in spatial query implementation with its rich topological structure.

This paper presents a 'Concept Map' (figure 1) for realizing On-demand web mapping by zooming down the theme, identifying the main subject areas to the detailed levels of specific sections with their hierarchical relations. Then the paper provides a brief introduction to each specific section. Finally, it provides conclusions on the gap identified along the specific sections.

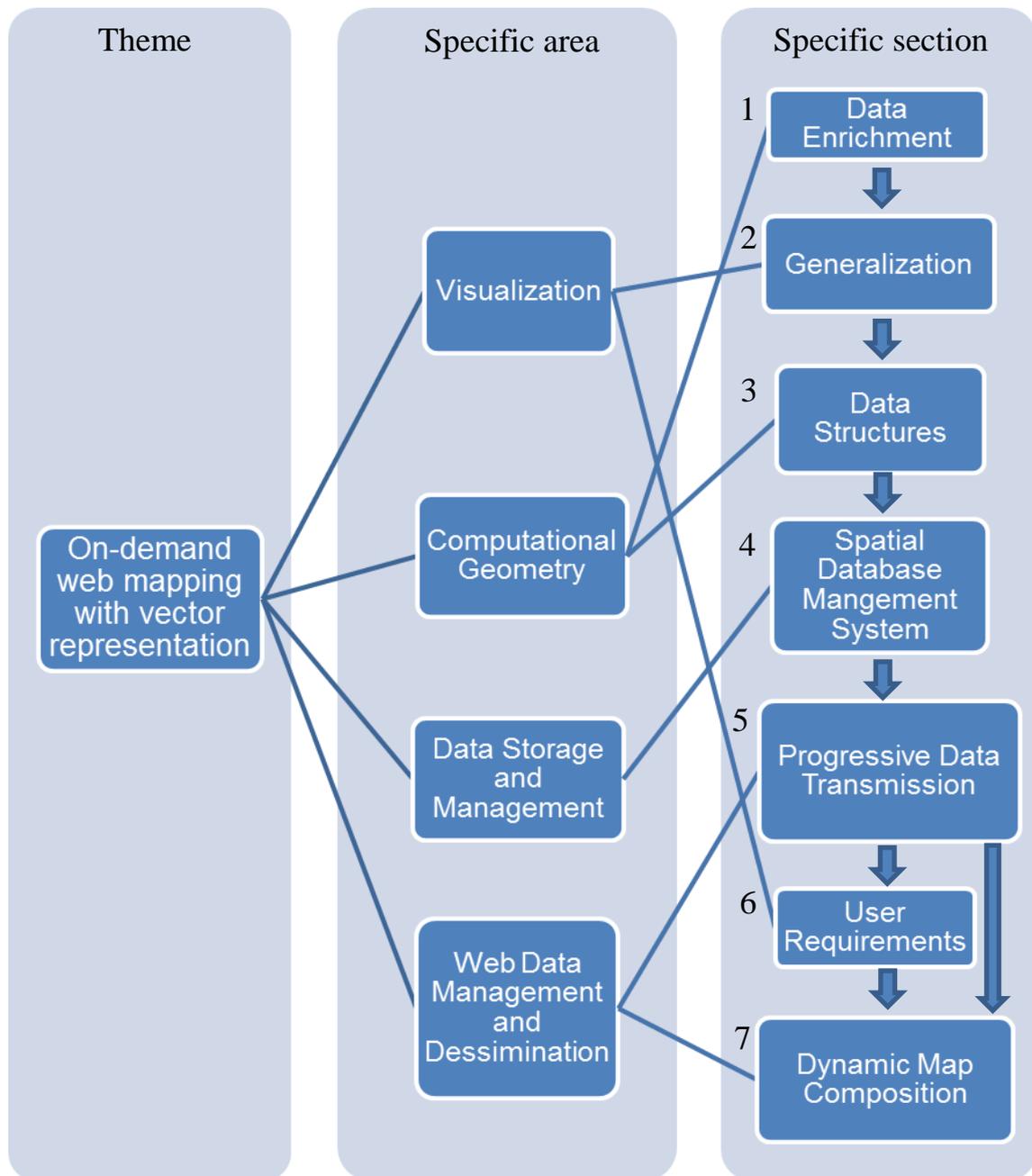


Figure 1: Concept Map

## 2. Concept Map

### Section 1: Data enrichment

With the advancement of technology, visualization of maps is no longer limited to printed maps. In order to view spatial data on different levels of details on vario-scales on-demand, real-time generalization has to be applied. Generalization algorithms are complex and particularly when integrating several generalization algorithms in the generalization process, computation becomes heavy and time consuming. This would add more complexity on transmission of spatial data over web efficiently. Therefore, pre-computation and storage of auxiliary information (secondary information) off-hand to be utilized in the subsequent generalization process is the ideal way to improve the

generalization process. The process of adding auxiliary information is called the data enrichment.

## **Section 2: Generalization**

Generalization is the process of reduction of details retaining geometrical and descriptive characteristics with topological relations when deriving smaller scale representations from a large scale representation. With the availability of digital data processing, generalization has been further divided into two types; database generalization and cartographic generalization. Database generalization is more into the reduction of data which do not cause any object conflicts after generalization. For example, re-classification and removal of data are such database generalization operations. Furthermore, cartographic generalization may cause object conflicts since more emphasis is paid to the visual enhancement of the details. For example, enlargement, displacement, exaggeration and simplification are some of the cartographic generalization operations.

## **Section 3: Data structures**

A data structure is a schema of organizing related pieces of information in a computer in a way information can be used efficiently. There are different kinds of data structures such as Quad tree, Binary tree, R-tree, Reactive Tree, Multiline Tree and Priority Queues available for processing of large volume of both vector and raster spatial data and are suited to different kinds of applications. Indexing used in spatial database management systems are based on either one or more of these data structures. However, these data structures have to be modified or new structures have to be developed to support construction of web maps on demand at vario-scales.

## **Section 4: Spatial Database Management System**

A Spatial database management system (SDBMS) is a software to store, maintain and query spatial data in addition to processing aspatial data. Such a system can not only support native geometry types such as point, line and polygon but also some complex geometry types such as multi-points, multi-lines and multi-polygons. For example, a parcel that is cut into two polygons by a road running across can be assigned a unique identification number by representing the parcel as a single multi-polygon. A SDBMS also has powerful spatial analysis operations of interest for GIS applications, which general desktop GIS software do not have. Furthermore, a SDBMS has the ability to store large amount of data, to track lineage of all transactions, to maintain data security and to query data efficiently using spatial indexes.

## **Section 5: Progressive Data Transmission**

It is a technique used to transmit a large volume of data over World Wide Web (WWW) from a server site progressively starting from coarser level of details applying generalization techniques and gradually reconstructing the whole amount of data at client site. It not only speeds up the web transfer but also offers users to view and query required level of details efficiently on vario-scales.

## **Section 6: User requirements**

User requirements are an important aspect of disseminating spatial data over Web. In designing an on-demand web map service, several factors such as data output formats, purpose of data, expected data retrieval and query speed, screen resolution, type of background screen colours and symbology to be used and which level of details are mostly required on which particular scale together with hardware and software requirements need to be analyzed.

## **Section 7: Dynamic map composition**

This refers to how a final map is constructed and displayed on-demand from the data transmitted from the server site to the web client from dynamic data sources such as databases. Basically this task is very client-specific, with different options available to implement the web client (e.g., web browser with JavaScript and cascading style sheets; plug-ins; Java applets; Java applications) based on fine-tuning to the specifications of the user requirements dealing with responds to interactive requests (e.g., changes of the zoom level, changes of colour and map symbols) by the client.

## **3. Conclusions**

The paper has derived a Concept Map to identify the related areas to deal with On-demand web mapping, which provides a basis to create a frame work for on-demand web mapping. The gap of knowledge to be addressed in the context of On-demand web mapping lies in the following areas:

- Formalization of data enrichment and generalization process according to user requirements.
- Design of data structures for the efficient management of multiple geometric objects at vario-scales in support of all cartographic generalization operations.
- Restoration of topological consistency among multiple geometric objects after composition in the client site at vario-scales.
- Requirements on the concepts of geometrical representation on vario-scales from the user point of view.

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**“Everyone thinks of changing the world, but no one thinks of changing himself “**

**- Leo Tolstoy**

## 3D Geo-information from image based modelling

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**ABSTRACT:** Nowadays image-based modelling is receiving much more attention and many applications require precise and photo-realistic 3D models. The generation of 3D models from terrestrial images are very realistic for the many applications and planning process. The techniques used for 3D modelling of Geoinformation sometime referred to as Close range photogrammetry has dealt for many years with manual or automatic image measurements for precise 3D modelling. The camera calibration and orientation phases are key steps in 3D modelling process. If these phases are not accurately performed, there will be some errors in the final model and for some applications low accuracy results are not accepted. The 3D models which were properly calibrated and oriented can be used for several applications. Nowadays 3D scanners are also becoming a standard source for input data in many application areas, but image-based modelling still remains the most complete, economical, portable, flexible and widely used approach. This paper presents 3D modelling from terrestrial images.

### 1. Introduction

The image based modelling is widely used in many fields for the convenience of the work such as civil engineering, urban planning, mapping, environment, forestry, etc. The procedure for image based modelling is currently being automated using different type of algorithms. The automation is classified into two categories such as fully automated 3D model of scene from images and semi automated 3D reconstruction of the scene from images (Remondino & El-Hakim, 2006).

### 2. Automated 3D reconstruction

In the automated method the whole process of 3D modeling such as taking images, calibration, orientation, and modeling is automatically performed. This is achieved on the basis of projective geometry of successive images followed by the bundle adjustment. That results the determination of camera parameters. The reconstruction of the model is normally done using the computed camera parameters from the self calibration. Though the automated procedure is widely used in computer environment, it is not an easy task in practical application. In automated 3D modeling it is necessary to have highly structured and good textured image with uniform camera motion for the success of the modeling. The degree automation is strictly related to the quality of the 3D model application as it is subjected to some errors. Therefore automated 3D modeling from un-calibrated images is limited for the finding of point correspondence and camera pose as the generated model is necessary to undergo human interaction for the post processing operation. So the combination of human ability of image understanding would speed up the process. In fully automatic 3D reconstruction from the images the calibration and orientation are performed separately and object modeling is fully automatic using the geometric constraints like perpendicularity and verticality. For the automatic reconstruction of object the prior defined parameterized blocks are used in the computer software. The surfaces of the objects are modeled with the planes. The combination of each plane makes the 3D objects. It is necessary to have projective geometry for the detection of features automatically matching the dense point cloud of complex object. The surfaces of the features measure automatically computing the 3D coordinates at the same time. The fully automated 3D modeling method detects the objects in closely spaced images and uses the projective geometry for the camera parameter estimation and matching point cloud within the voronoi regions. So the automation is still required the operator involvement up to some extent.

The automated reconstruction of 3D model was successfully applied for the extraction of the buildings in archaeological site and the realistic models was generated (M. Pollefeys, R. Koch, M. Vergauwen, & Gool, 2000). Another successful application is modeling of Bamiyan statues. With the combination of multi resolution geometry and multi temporal high resolution images the Bamiyan statues were reconstructed with the image based modeling (Gruen, Remondino, & Zhang, 2005). So the 3D modelling is also used for the visualization and animation of the cultural and tourist information system.

### **3. Semi Automated 3D reconstruction**

The orientation and calibration of images in semi automated 3D construction is done interactively or automatically then human operator engaged in the semi automated modeling (Remondino & El-Hakim, 2006). The semi automated method which consists of definition of topology and post processing of 3D data is commonly used in 3D modeling of complex objects. The assumptions such as perpendicularity or parallel surfaces are used to generate the correct model using the semi automated output based on the measured points and help to increase the degree of automation procedure. The accuracy of the modeling depends on the accuracy of camera parameters. According to Voltolini et al (2006) the most significant parameters in image modeling are the focal length and the radial lens distortion. However the assumption of the location of principle point in the center of the image does not affect significantly on the 3D modeling accuracy as the error due to that is eliminated by the exterior orientation. The amount of information input for 3D modeling is a matter of speed of the process in computer and also the cost of the process. According to Miguel et al (2006) semi automated 3D reconstruction of urban areas using epipolar geometry and template matching is the low cost and any urban area can be modelled using a reduced amount of input information for camera calibration.

The geometrically accurate and realistic 3D models can be obtained using the approach of two step process. First basic geometry is built using polyhedral model elements with known camera parameters then automated matching procedure is adapted for the details. The occluded objects in images affect the geometric accuracy but, with the help of coplanarity constraints the modeling of occluded objects can be done accurately (Remondino & El-Hakim, 2006). And also the higher geometric accuracy can be achieved using calibrated and oriented images by the photogrammetric bundle adjustment without any assumptions. Entering the shape parameters such as width, length, height, etc... the accurate geometry of the any object can be modeled semi automatically. The semi automated image based modelling consists of four steps such as image capturing, calibration, modelling, and texturing. The image capturing can be done using a normal digital camera with constant base depth ratio.

### **4. Calibration**

The determination of camera parameters is done in the calibration step. That means the establishment of the properties of camera expose at the image capturing. That is the establishment of three dimensional spaces in the computer environment with the help of image coordinate. Using the two overlapping image pair (stereo pair) the position, rotation, focal length and lens distortion of the camera at its expose are calculated. This is done using the tie points marked by the operator. After adding sufficient number of tie points for the establishment of arbitrary 3D space, the arbitrary 3D model of the object is generated for the

overlapping area. Adding more overlapping images to cover the object, 3D model can be generated. That model should be reference to ground by adding distance constrains, right angle constrains and planer constrains and also defining a reference coordinate system.

## **5. Modeling**

The modelling in computer is the process of creating the three dimensional geometry of the object using different type of shapes. These shapes are made up with points, line and vertices. There are different type of geometric modelling techniques such as unstructured sets, wireframe models, surface and volumetric models. The necessary calculation for the creation of different type of shape is done by the 3D software packages. Image modelling software consists of different type of primitive shapes such as plane, cube, cylinder, sphere and disk. Using these primitives the shape of 3D objects are created according to their dimensions.

## **6. Texturing of the object**

In the modelling stage the geometry of the object in space is generated but the natural materials like colour, pattern on each surfaces are not still incorporated to the created objects. The texturing is the process of applying the related material to each surface of the 3D objects. The texturing can be done using photographs or images taken from the reality or using RGB colours. In texturing process software package creates the material from the selected image corresponding to the relevant surface and apply that material to the relevant surface. The texturing gives the realistic appearance to the model. The quality of the texture depends on the quality of the graphic cards and the system performance.

## **7. Accuracy of the model**

The accuracy of the model can be assessed using some measurement in the reality. For the accurate model the well distributed tie point for the calibration should be selected precisely and more constraints (distance, right angle and planer) should be added to the model.

## **4. Discussion**

The image based modelling is an excellent tool for the visualization of real word objects for many applications. It is an interesting and valuable process for GIS agencies and VGI providers as they are focusing towards the virtual reality for their customers. It is the path to visualize the reality and to say bye to the traditional mapping. This technology is suitable for the modelling and visualization of cities and it can be published on Google Earth too. The figures below show some 3D models from terrestrial images visualized on Google Earth. As survey department is the sole agency for Geo-information in our country it is better to focus on 3D Geo-information for the future development of the country.



Figure 1: Side views of 3D model of Temple of tooth at Kandy

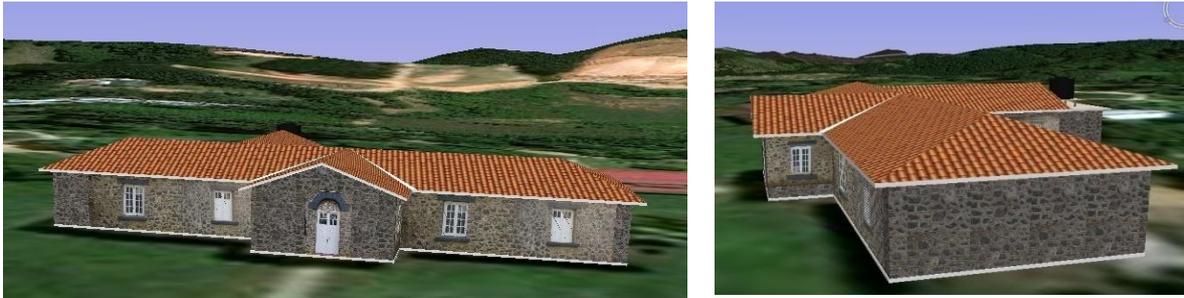


Figure 2: Front and side view of 3D model of Quarter number 31 at ISM



Figure 3: Side views of 3D model of the ISM main building



Figure 4: 3D view of ISM

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***“Professionalism: It’s NOT the job you DO, It’s HOW you DO the job.”***  
– Anonymous

***Excellence is not a skill. It is an attitude.***  
~Ralph Marston

***Nothing is interesting if you're not interested.***  
~Helen MacInness

## உற்பத்தித்திறனும் நிலஅளவை அலுவலகங்களில் 5 எஸ் செயற்திட்டமும்

பொ. சிவானந்தன், நில அளவை அதிகாரி, சிரேஸ்ட விரிவுரையாளர்,  
அளவையியல் படமாக்கல் நிறுவனம், தியத்தலாவை.

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இன்றைய நவீன உலகில் உற்பத்தித்திறன் என்னும் எண்ணக்கருபற்றி பல்வேறு தரப்பினரும் பிரஸ்தாபித்து வருகின்றனர். யப்பான் போன்ற வளர்ச்சியடைந்த நாடுகளின் முன்னேற்றத்தை அவதானிக்கும்போது அந்நாடுகள் உற்பத்தித்திறன் பற்றிய எண்ணக்கருக் களுக்கு எவ்வளவு முக்கியத்துவம் கொடுத்து வந்தன என்ற உண்மை புலனாகும். இரண்டாம் உலகமகாயுத்தத்தின்போது மிகமோசமான பாதிப்புக்குள்ளான யப்பான் அதன்பின் மிகவேகமாக முன்னேறியது. இதற்காக வேலைக்குழு, சரியான முகாமைத்துவ முறை, சேர்ந்து நடத்தும் முகாமைத்துவம், தலைமைத்துவ அபிவிருத்தி ஆகிய நுட்பங்களைப் புகுத்தியபோது 5 எஸ் எனக் கூறப்படும் உற்பத்தித்திறன் உத்திகளில் ஒன்றையும் யப்பான் பாவித்தது. இதனால் தொழிலாளர் பிரச்சனைகள், வேலைநிறுத்தங்கள், நேரத்திற்கு மாத்திரம் வேலை போன்ற தொழிலாளர் பிரச்சனைகள் இல்லாதுபோய் இயந்திரங்களின் சரியான இயக்கம், தரமான பொருட்களின் உற்பத்தி என்ற இலக்கை சுலபமாக அடைந்தது. இவ்விதம் அறிமுகப்படுத்தப்பட்ட இந்த 5 எஸ் யப்பானில் அரசாங்க அலுவலகங்களிலும், தனியார் நிறுவனங்களிலும், பாடசாலைகளிலும் மாத்திரமன்றி வீடு வாசல்களிலும் செயற்பட ஆரம்பித்து யப்பானிய சமூகத்தின் வாழ்கையுடன் இணைந்ததொன்றாக மாறியது. இதனால் யப்பானிய மக்கள் மனப்பழு இன்றி தங்கள் வேலைகளைச் செய்து தமது நாட்டுன் செல்வத்தைப் பெருக்க தங்களால் ஆன பங்களிப்பை வழங்கினார்கள்.

இவ்விதமாக முன்னேறிய யப்பானைப் பின்பற்றி ஆசிய நாடுகளான சிங்கப்பூர், மலேசியா, கொரியா, தாய்வான் ஆகிய நாடுகள் 5 எஸ் எண்ணக்கருவை நடைமுறைப்படுத்தி பெருவெற்றி அடைந்தன. தற்போது நமது நாட்டிலும் அரசு, தனியார் அலுவலகங்களிலும் 5 எஸ் எண்ணக்கருவையும் உற்பத்தித்திறன் செயற்திட்டத்தையும் மேம்படுத்துவதற்கு அரசு பெரும் நடவடிக்கையை மேற்கொண்டு வருகிறது. இதற்காக தேசிய உற்பத்தித்திறன் செயலகம் தாபிக்கப்பட்டு அதன் பணிகள் நாடுமுழுவதும் பன்முகப்படுத்தப்பட்டு வருகிறது. இதற்காக அலுவலகங்களுக்கிடையில் போட்டிகள் நடத்தப்பட்டு சிறந்த அலுவலகங்கள் தேர்ந்தெடுக்கப்பட்டு அவற்றின் தரம் மேம்பாடடைய ஊக்குவிக்கப்படுகின்றன. 5 எஸ் எனப்படுவது யப்பானிய மொழியில் வரும் பின்வரும் ஐந்து சொற்களின் முதலெழுத்துக்களாகும்.

- SEIRI (Short) -செய்றி
- SEITON (Set in order) -செய்த்தோன்
- SEISO (Shine/Sweep) -செய்சோ
- SEIKETSU (Standardize) -செய்கெட்சு
- SHITSUKE (Sustain) -சித்சுகே

உற்பத்தித்திறனை மேம்படுத்த பல்வேறு வழிமுறைகளிருந்தும் 5 எஸ் நுட்பமானது மிகவும் இலகுவாகச் செய்யக்கூடியது, யாவருக்கும் இலகுவாக விளங்கக்கூடியது, எந்த இடத்திலும் நடைமுறைப்படுத்தக்கூடியது, மிகக்குறைந்த செலவில் செய்யக்கூடியது மற்றும் உற்பத்தித்திறனை மேம்படுத்த அடிக்கல்லாக அமைவது போன்ற காரணங்களால் முக்கியத்துவம் பெறுகிறது. மேலும் 5 எஸ் இன் முப்பரிமாணங்களாக அமுல்படுத்தல் (Implementation), அர்ப்பணிப்புடன் கூடிய ஈடுபாடு. (Habitual Practice), தேக்கத்தை தவிர்த்தல். (Prevention of Accumulation) என்பன அமைகின்றன.

- **SEIRI (Short)** - செய்றி

தேவையானவை எவை, தேவையற்றவை எவை என வேறுபடுத்தலும் தேவையற்றவற்றை அகற்றுதலும் மற்றும் குப்பை கூழங்களை அகற்றுதலும். இதற்காக நாம் பின்வருமாறு வகைப்படுத்தலை செய்து தேவையற்றவற்றை அகற்றலாம்.

- ❑ தேவையற்றவை, இலகுவில் அப்புறப்படுத்தக்கூடியவை, விலைமதிப்பற்றவை
- ❑ தேவையற்றவை ஆனால் விலைமதிப்புள்ளவை
- ❑ தேவையற்றவை, இலகுவில் அப்புறப்படுத்த இயலாதவை, விலைமதிப்பற்றவை
- ❑ அடிக்கடி நேவைப்படுபவை அல்லது உபயோகப்படுத்துபவை
- ❑ அடிக்கடி தேவைப்படாதவை.

தேவையற்றவற்றை நீக்க களஞ்சியப்படுத்தலைக் கட்டுப்படுத்தலாம், தேவையற்றவற்றை அழித்து விடலாம், தேவையற்றவற்றை விற்பனை செய்யலாம், வேறு இடத்தில் களஞ்சியப்படுத்தலாம், தேவைக்கு ஏற்ப ஏனைய பகுதிகளுக்கு பகிர்ந்தளிக்கலாம், தேக்கி வைக்கும் மனப்பாங்கினை கட்டுப்படுத்தலாம்.

### ■ SEITON (Set in order)

- செய்த்தோன்

தேவையானவற்றை இலகுவில் எடுத்துக்கொள்ளும் விதத்தில் ஒழுங்குபடுத்தி வைத்தல். இதற்காக நாம் Labeling, Visual Control, Marking உடன் Colour System ஐயும் பாவிக்கலாம்.



- ✓ எல்லா பொருட்களையும், உபகரணங்களையும் இடம் குறித்து பயன்படுத்தல்.
- ✓ இந்த பொருள் இந்த இடத்துக்கானது, இந்த இடம் இந்த பொருளுக்கானது.
- ✓ தேடுதலுக்கான நேரத்தை குறைத்தல்
- ✓ ஒழுங்கமைத்து பேணும் மனப்பாங்குவளர்ச்சி.

### ■ SEISO (Shine/Sweep)

-செய்சோ

தினமும் சுத்தப்படுத்தலை கிரமமாக மேற்கொள்ள வேண்டும். இடத்தின் சுத்தத்தை இடைக்கிடை சோதனையிடவேண்டும். இடைக்கிடை சிரமதானங்களை ஒழுங்குசெய்து சுத்தப்படுத்தலை மேற்கொள்ள வேண்டும். அதாவது செய்சோ ஆனது முறையாக சுத்தம் பேணுதலும் அழகு படுத்துதலும் ஆகும்.

### ■ SEIKETSU (Standardize) - செய்கெட்சு

தர மேம்பாடும் ஏற்றுக்கொள்ளப்பட்ட முறைகளை பின்பற்றுதலும். செய்றி, செய்த்தோன், செய்சோ ஆகியனவற்றை இடைவிடாமல் முன்னேற்றல் ஆகும். இதற்காக

- ✓ கால அட்டவணைப்படி செயற்படல்.

✓ பிரிவுகளுக்கிடையிலான போட்டிகளை ஏற்பாடு செய்தல் என்பவற்றைச் செய்யலாம்.

## ■ SHITSUKE (Sustain) - சித்தசுகே

பயிற்சியும் ஒழுக்க நெறிகளும் இதில் அடங்குகின்றது. சகலருக்கும் 5 எஸ்ஐ கற்பித்தல். உற்பத்தித்திறன் உத்திகளில் ஒன்றான 5 எஸ்இன் பயன்களாக உள்ளூணர்வில் மாற்றம், நிறுவனத்தின் உள்ளும் புறமும் மாற்றம், சேவை உணர்வு திருப்தி என்பவற்றைக்கொண்ட பணியாளர் குழு ஒன்றை உருவாக்குதல், பாவிக்கும் இடத்தினை உச்ச அளவில் பாவித்தலும் அழகாக வைத்திருத்தலும் மற்றும் மூலப்பொருட்களை சிறந்த முறையில் பாவித்தல் போன்ற நன்மைகளும் ஏற்படுகின்றன. இதன்மூலம் உயர் உற்பத்தி, உயர் தரம், செலவீனங்களைக் குறைப்பதன்மூலம் நட்டமேற்படுதலைக்குறைத்தல், சேவையின் தரம் வளர்ச்சியடைதல், பொது மக்களின் சேவை வளர்ச்சியடைதல், ஒற்றுமையின் வெளிப்பாடு மேம்படுதல், வினைத்திறன் வளர்ச்சியடைதல், இயந்திர உபகரணங்கள் பழுதடைதலைக் கட்டுப்படுத்தல், விபத்துக்கள் குறைதல் மற்றும் உரிய நேரத்தில் வினியோகம் என்பன போன்ற மேலும் நன்மைகள் ஏற்படுகின்றன.

இன்றைய உலகில் உற்பத்தித்திறன் என்பது பொருளாதார வளர்ச்சியைப் பெருக்கவும், நாணய மதிப்பினை ஸ்திரநிலையில் வைத்திருப்பதற்கும், சிறந்த வாழ்க்கைத்தரத்தைப் பேணுவதற்கும் அவசியமான ஒரு கருப்பொருளாக உள்ளது. உற்பத்தித்திறனானது ஒரு எண்ணப்பாங்குடன் அமைந்தது (Mental Attitude), நடைமுறை ஒழுங்குடன் சம்பந்தப்பட்டது (Practical Action), தெளிவாகக் காணக்கூடியதாக இருப்பது, தரமேம்பாடு, அளவு என்பவற்றை விருத்தி செய்வது (Quality), மக்களின் வேலைக்கு மேலதிக பெறுமதி சேர்ப்பது (Adding Value), குழு ஒற்றுமையை உருவாக்குவது (Team Sprit), வினைத்திறனுடனும் (Efficiency), பயன்தரு வினைத்திறனுடனும் (Effectiveness) சம்பந்தமுடையது. மேலும் இது நுகர்வோனின் விருப்பத்தை நோக்கி அமைந்தது (Customer Orientation). அறிவு (Knowledge), வேலைத்திறன் (Skills), மனோபாவம் (Attitude), குழு முறைமை (Team Work) என்பவற்றுடன் தொடர்புடையது. எனவே 5 எஸ் என்ற எண்ணக்கரு சாதி, மத, குல, நாடு பேதமின்றி எந்த மட்டத்திலும் நடைமுறைப்படுத்தக்கூடிய ஒரு எளிய கருத்துரு ஆகும். மேற்கூறிய 5 எஸ்ஐ நடைமுறைப்படுத்தியதால் யப்பான் நாடு பின்வருவனவற்றைப் பபித்துக்கொண்டது.

- ❖ நிறுவனங்களை நல்ல விதத்தில் முகாமைத்துவம் செய்ய வேலை செய்வோரின் பங்களிப்பு மிகவும் அவசியம்.
- ❖ தனியே வேலை செய்வதைவிட ஒன்றுபட்டு உழைப்பதன் பயன் அதிகம்.
- ❖ எந்த ஒரு வேலைக்கும் தொடக்கவேலை அதற்கு அபித்தளமிடுவதே.
- ❖ விபத்துக்களைக் குறைக்கும் விதங்கள்.

ஆகவே நாமும் 5 எஸ்ஐ எமது நிலஅளவை அலுவலகங்களில் நடைமுறைப்படுத்துவதன்மூலமும் மற்றவர்களுக்குக் கற்பிப்பதன் மூலமும் சிறந்த பலனை அடைவது மட்டுமன்றி உற்பத்தித்திறன் விருத்தி ஊடாக பெறப்படும் உன்னதமான அரச சேவையின் மூலம் நமது நாட்டினை ஆசியாவின் ஆச்சரியமாக மாற்றுவதற்கான சவால்களில் வெற்றிகொள்ள எம்மாலான பங்களிப்பை வழங்கமுடியும்.

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“Vision is the art of seeing what is invisible to others”.  
- Jonathan Swift

## FLASH BACK OF SURVEY JOURNALS

By

M.T.M. Rafeek, Supdt. of Surveys

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In the Survey Journals Nos.78 & 79, we highlighted some of the interesting flash backs from old survey journals to make awareness to new officers in the department as regards the ancient times history and interesting experiences. In the survey journal No.78, survey journals 1 to 15 and in 79, survey journals 16 to 22 were summarized. This article continues to summarize from 23 to 28 to share the interesting experiences as reminiscences.

**News Letter No. 23** was published in August 1956, by order of Mr. N.S. Perera, Surveyor General of Ceylon and edited by Mr. S.Karthigesu, Superintendent of Surveys. In this journal, some photographs of 'Camp Life' taken by Mr. D.B.Rulach, Govt. Surveyor, were published.

**News Letter No. 24** was published in February 1957, by order of Mr. N.S. Perera, Surveyor General of Ceylon and edited by Mr. S.Karthigesu, Superintendent of Surveys. In this journal an interesting poem was published under the heading of **"A Voice of Warning or the Miseries of a Land Surveyor's Wife"**. When you visit ISM just refer this poem.

**News Letter No. 25** was published in August 1957, by order of Mr. N.S. Perera, Surveyor General of Ceylon and edited by Mr. S.Karthigesu, First Assistant Surveyor General. On this issue Bertram Rulach, Govt. Surveyor had written a true story about Surveyor Derek Sumith who went to home after long spell in the jungles and the story read like this.

"Surveyor Derek Smith was in Colombo recently after a long spell in the jungles. Like a sailor back in port after a long voyage, he decided to make merry. The return to civilization happened to coincide with the special General Meeting of the Government Surveyors Association. There were many Surveyors in town, and the exchange of pleasantries went on deep in to the night. The time came to part, and, to the surprise of everyone, Derek Smith declared that he did not know where his home was. It transpired that Derek's home folk had "changed quarters" recently and Derek had only a hazy notion of the new address. The hunt was on. The enthusiastic search party, tired and worn-out, soon dwindled to three-Surveyors Norman Mendis, Jayampthi Yatawara and Derek Smith. The place seemed a new jungle, and many a bleary-eyed house-holder had to answer question where so-and-so lived. Time was moving on, and it looked as if the searchers would have to spent the night on a park-bench. "Let's have one more try" said Yatawara, that house there has a welcome look!" Smith went up and banged long and hard. There were movements inside, and after what seemed an eternity, the door inched open. "Don't move", hissed a voice. Derek peered through the darkness, and found to his horror that he was staring into the twin barrels of a shotgun! Up went his hands, in true Western style: "D-don't shoot, please" he managed to stammer. Someone sprayed the light from a torch over the searchers. "hey, mum it's Derek," yelled a voice. Surveyor Derek Smith was home."

Those days surveyors and their supervising officers in some occasions had interesting and heated words across their work and one of the heated words in a letter is published on this issue and given here. A Surveyor, applying for leave, has given a new twist to the hackneyed expression "private business". In the "Reasons for Application" cage of the form he wrote "my own business". The Supervising Officer is said to have tactfully queried this departure from the usual phraseology. The Surveyor it appears, had no particular love for his

supervising officer, replied that “My own business” in other word is “private business” and it also means “Not Your Business”!

First time the history of survey journals a story was written in Tamil language in this issue. The heading of the story was ‘Opinion of a wife of surveyor’ which was written by Mrs. Ponnambalam and it is given below.

பல கதைகளைக் கதைத்து தேநீரும் அருந்திவிட்டு எனது சிநேகிதி, ராகினி கேட்டார், “அதெல்லாம் சரி ராஜே, நீங்கள் அடிக்கடி உங்கள் கணவரைப் பிரிந்திருக்க நேருகிறதே, அதையிட்டு நீங்கள் மனம் நோகவில்லையா?

யான் ஒரு புன்னகையுடன், “மனம் ஏன் நோக வேணும்? அவரவர்களுக்கு விதித்தது தானே உள்ளது” வள்ளுவர் சொல்லியுள்ளாரே, “வகுத்தான் வகுத்தவகையல்லால் கோடி தொகுத்தார்க்கும் துய்த்தல் அரிது”. நீங்கள் ஒரு ஆசிரியரை மணம் செய்தமையால் உங்கள் குடும்பம் ஒரே இடமாக இருக்கின்றது. நாள்தோறும் கணவரின் இன்ப துன்பங்களில் கலந்து கொள்ளலாம். பிள்ளைகளின் படிப்பு குழம்பாது. அவ்வளவு தானே?

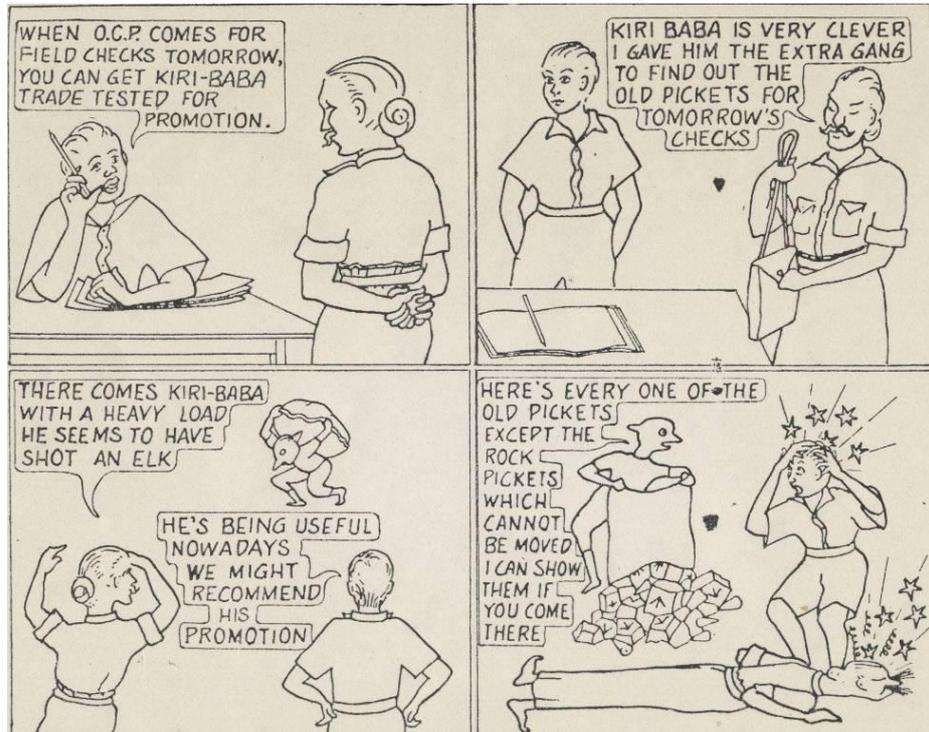
ராகினி: ஆமாம், ஆமாம்

யான் சொன்னேன் “எனது கணவரின் உத்தியோகம் நல்லதல்ல என்கிறீர்கள். அப்படியல்லவா? சொல்லுகிறேன் கேளுங்கள். (1) உத்தியோகங்களில் முதன்மையுற்றதும் தொன்மை வாய்ந்ததும் நில அளவையாளர் வேலையாகும். (2). தாய்நாட்டுக்கே உழைக்க ஜென்மம் எடுத்தோம் என்றொரு பாட்டில் வருவது போல அவர்கள் தங்கள் நயங்கருதாது ஒரு நாட்டுக்கு உழைக்கவே பிறவியெடுத்தவர்கள். பெண்டியரையும், தங்கள் குழந்தைகளையும் இல்லங்களில் இருக்கவிட்டு உயிரையும் பொருட்படுத்தாது காடளக்கப்போகின்றார்கள். (3) அவர்களின் தொழில் மிகுந்த நுணுக்கம் வாய்ந்தது. அளந்து கணக்கிடுகையில் ஒரு மயிரிழை அளவுள்ள தூரம் பிழைத்தாலும் போதும் முழுவதும் பிழைதான், அவதானம் வேண்டும். இவ்வளவு நுணுக்கமான வேலையில் ஒரு நில அளவை உத்தியோகத்தருக்கு எவ்வளவு பொறுமை இருக்க வேண்டும் என்பதை உங்களால் கணிக்க முடியுமா? (4) தேக ஆரோக்கியம் தான் ஒரு சமயம் குன்றியிருந்தாலும், பிடிவாதமும் நெஞ்சுரமும் ஒரு நில அளவையாளருக்கு இருக்கவே செய்யும். (5) நுணுக்கமான வேலை பார்க்கும் இவர்களுக்கு விசாலமான மனதுண்டு. தன்னுடைய கூடாரத்திற்கு வரும் ஒரு விருந்தினன் அல்லது அன்னியனாயினும் சரி, அவரைத் தக்க உபசரணை செய்து வழியனுப்பாமல் விடமாட்டார்கள். (6) மனைவியையும் மக்களையும் அடிக்கடி பிரிந்திருக்கின்றமையால் மக்களில் கூடிய பாசமும், மனைவியில் களங்கமற்ற காதலும் என்றும் நடம்புரியுமென நினைக்கின்றேன். (7) கடவுள் வழிபாடு மிகவும் முக்கியமான விடயமல்லவா? இந்தக் காலத்தில் பொதுவாக எல்லா நில அளவை உத்தியோகத்தார்க்கும் அவர்களுடைய வேலையாட்களுக்கும் கடவுள் வழிபாட்டில் நம்பிக்கை உண்டு. தமிழராக இருந்தாலும் சரி, சிங்களவராக இருந்தாலும் சரி, அல்லது வேறு எந்த ஜாதியினராய் இருந்தாலும் சரி அவர்களுக்கு ஆண்டவனில் நம்பிக்கை இருக்கவே செய்கிறது. வெளித்தோற்றமும் பேச்சும் ஆண்டவனில் நம்பிக்கையற்றதாக இருந்தாலும் மனிதரின் நெஞ்சம் அவரை நிச்சயமாகத் தொழுது வணங்கும்.

ராகினி:- ராஜே! நில அளவை உத்தியோகத்தை வியக்கின்றேன். கெட்ட குணங்களையும் ஆட்கொள்ளவல்லது. தொன்மை வாய்ந்தது, தன்னலங்கருதாதது, நெஞ்சுரத்தைக்கொண்டது. இத்தகைய எத்தனையோ சிறந்த பண்பாட்டுக்குரிய இத்தொழிலை யான் புகழ்கிறேன். நீங்கள் ஒரு நில அளவை உத்தியோகத்தரை மணம்புரிந்தது, நீங்கள் செய்த பக்கியமாகும். எனக்கு ஒரே ஒரு மகன் அவனையும் ஒரு சேவையர் ஆக்கவே முயல்வேன். சரி வரட்டுமா ராஜே?

யான்: போய் வாருங்கள் ராகினி, நமஸ்காரம்.

Those days field survey assistants were mostly appointed by surveyors with the approval of their supervising officer the cartoon (in the right hand site) which published in this issue to memorise this matter.



**News Letter No. 26** was published in April 1958, by order of Mr. V.Rasaretnam, Surveyor General of Ceylon and edited by Mr. J.R.Sinnathamby, Superintendent of Surveys. There was an article regarding the Diyatalawa Sports Club Celebrations and one photographs also published in this issue which also memories the golden and olden day's celebrations at Diyatalawa which is republished at the end of this article.

In the history of our nation there was big flood was recorded in the year of 1957 and that surveyors were also affected by this flood while they were camped in jungles. There are few incidents were reported in this issue and two of the incidents are given below.

Mr. Kanapathipillai, Govt, Surveyor stationed at Mannar and his experience regarding in 1957 flood is given below.

“On December 25 at about 5 p.m. the camp labourer shouted out to Mr.Kanapathipillai that the flood waters were rolling their way. Mr. Kanapathipillai raised his head and saw a mountain of water rushing on them, and both he and his labourer started packing the documents. When they were in the process of packing, the waters had reached his camp and the level was steadily rising at the rate of about 1 foot in 15 minutes. They completed the packing of the documents with extraordinary speed and ran to the highest place in the area – the police Barracks – and hung up the upright plan box and a tin rill to a beam 15 feet above ground, the bottom of the plan box being 9 feet above the floor, and as luck held, the flood waters camp swept under the plan box but did not submerge it. Mr.Kanapathipillai’s private diary for this period speaks for itself:-“

- 24.12.57 From home to Madhu Road.
- 24<sup>th</sup> Plan work.
- 25<sup>th</sup> 6 p.m. Removed things from my camp to the only camp (labourers) available on higher elevation.

- 26<sup>th</sup> 3 a.m. Started removing my government Stores and furniture from that camp to the Police Barrier shed close by: went to Police Barracks with plan box.
- 26<sup>th</sup> 5 p.m. At Police Barracks. Heaved a sigh of relief that the field books and plans were kept in a safe place, from where I may have to run with the others, if the situation worsens. (The field books and plans, in an upright plan box and tin roll, were hung up on to the beam of the Barracks building .the beam was 15 feet above the floor and the bottom of the plan box was approximately 9 feet above the floor).
- 26<sup>th</sup> night Situation has worsened. Escaped to Madhu Church, wading through waist deep of water and the rest of the way on foot. Placed myself at the disposal of the Parish Priest at Madhu Church.
- 27<sup>th</sup> 10 a.m. Heard over the wireless that point Pedro was affected by the floods an going under. Feeling desperate.
- 28<sup>th</sup> a.m. Some hopes of seeing camp site.
- 28<sup>th</sup> p.m. Went in a L.D.O. lorry and through waist deep of water and made sure that my field books and plans were intact.
- 28<sup>th</sup> p.m. Had a sight of a helicopter, which issued flood parcels. Some hopes of reviving.
- 29<sup>th</sup> a.m. Started for Vavuniya wading through water and getting a lift in passing lorries, to contact any high officials.
- 29<sup>th</sup> p.m. Labourers at Madhu church; self looking after the welfare of the labourers.
- 30<sup>th</sup> Same as on 29<sup>th</sup> afternoon.
- 31<sup>st</sup> Assistant Superintendent of surveys visited me. Went with him and handed over the plans and field books.

Mr.K.Retnaraja, Government Surveyor, stationed at Kalmunai during December reports as follows :-

On December 24<sup>th</sup> at 9 p.m. my office Tent was blown off and torn to pieces by a strong cyclone and heavy rain that started suddenly. So with the help of two labourers, (as others were stranded at the out camp), and my wife I carried the boxes and tin rolls containing plans, field books and other documents that we were able to remove from the office tent, trees in the compound began to fall and one of them crashed on my car.

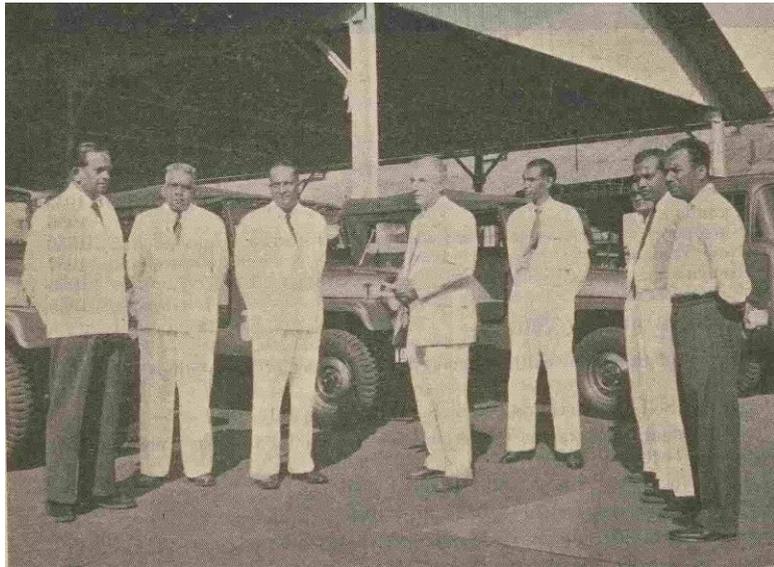
Then all the ropes of the other living tent gave way and it began to collapse. It was 10 p.m. now and all lamps got blown off by the wind and rain and we were in pitch darkness. By now the flood water had come up to the door steps. So with the help of a torch light we piled up the Plan box, tin rolls, files and other documents on my large dining table and covered them up with gunny bags, mats and mattresses. Before this job could be well completed the cadjan structure in which we were living also collapsed thereby driving out my wife and children and others into the open. Within this half an hour, water had comp up six inches inside the camp and one foot in the compound. Now it was a case of saving our lives; so we fled to a nearest building and spent the night there. It rained heavily the whole night.

Early morning there was three feet of water in my camp site. It was very fortunate that water was only up to the level of the dinning table and my documents were safe up to then. So they were transported to the road side some chains away from the camp where flood water had not risen. Some of the valuable cloths and jewels of my wife were also removed. Then after cutting away the fallen trees my car was pulled out of the collapsed garage to fine that the entire hood, bonnet and glass screens were badly damaged. By the time the car was removed

water had risen up to two and a half feet inside the building, where my wife and children stayed up to now. They were then removed to the hospital premises and my car and the documents to my friend's house not affected by the floods.

By (eleven) 11 p.m. on twenty- fifth the flood reached its highest level and evidence showed later that water had reached my camp up to 5 ft. none of the other government stores or private baggage could be removed until the water subsided. On the 27<sup>th</sup> water had gone down to 6 inches or so leaving behind plenty of weeds and rubbish brought in by the floods. As the place was waterlogged and full of fallen trees re-camping on the same spot was quite impossible. The two labourers and self kept watch over the goods that were scattered about in the compound and on January 6 with the help of the D.R.O., I found another place to camp out. Heavy loss and damage to private property and government stores was sustained.

Another milestone achieved in this year that is receiving 12 jeep vehicles to department that was donated by United States Government. Mr. V. Rasaretnam, Surveyor General, on behalf of the Government of Ceylon accepted the keys of the vehicles. To memorise this event a photograph was published in this issue that is given below. Mr. V. Rasaretnam is also in the photograph but I (Rafeek) never seen his photo earlier so, any one can help me to identify him on the photograph.



**News Letter No. 27** was published in October 1958, by order of Mr. V.Rasaretnam, Surveyor General of Ceylon and edited by Mr. J.R.Sinnathamby, Superintendent of Surveys. In this issue there were no particular interesting items to highlight.

**News Letter No. 28** was published in May 1959, by order of Mr. V.Rasaretnam, Surveyor General of Ceylon and edited by Mr. J.R.Sinnathamby, Superintendent of Surveys. This issue was published with a photograph in the front cover which shows how surveyors dressed those days while they engaged on field duties. That photograph is republished at the end of this article to make aware of new surveyors.

Another interesting story was published by Newton Silva a former Survey Student regarding his beginning days in ISM. You all should read the story because it will definitely memorise your days in the ISM. The story was titled as “DIYATALAWA – HERE COMES REGGIE!” and the story is given below.

“The second class compartment of “Uda Rata Menike“ was uncomfortably crowded. Reggie looked around the compartment and took stock of the crowd. Only one girl worth while looking at sighed and gazed out of the window. The journey was tedious, except for the few jokes cracked, and the few songs sung by his companions.

Diyatalawa was cold, but Reggie likes the climate. In a hut covered by wood, asbestos and galvanised iron sheets, Reggie started his life as a survey student.

The class room was a strange place for Reggie. The desks were too high, and the stools awkward. The instructor was fat, short, and had a charming smile. Reggie liked him. But the instructor looked at him coldly.

Back from the class, while at lunch with his companions, Reggie described his first experience in taking over stores.

“Today a terrible thing happened to me” started Reggie, “Our instructor wrote the list of stores on the black board and asked us to copy it down on the white form”.

“Not the white form, man” interrupted one, “it is from S 56”.

“Ah, that’s right” continued Reggie, “On that form we entered the stores. Later the stores were distributed, and the labourers carried them to my hut. They returned and asked me whether there’s any thing more to take. I told them that there’s a table to be taken and asked them to wait. I waited and waited but no table was forthcoming. So I checked the list of stores again, and found that the table was non other then the Boileau’s Travers Table.”

They all joined in the fun, as they too had similar experience.

For two whole weeks Reggie practised drawing circles, and circles. At the end of the 2<sup>nd</sup> day thoroughly disgusted he shouted out “I can’t lay any more oval eggs on paper “. The instructor who overheard Reggie’s remark, frowned at him. Reggie looked down innocently and laying more and more eggs on paper or rather went on practising draughtsmanship.

On the 2<sup>nd</sup> week he was ready for his first “field work.” It was a bright Monday morning, and attired in his best suit (Gabardine longs, and white long sleeved shirt) he went to the class. On seeing him his instructor remarked “This is not a dress suitable for field work. You must dress like a practical surveyor “ Reggie wondered whether there were any “theoretical surveyors“ as against “practical surveyors“ but on the following day he got into his shorts and short sleeved shirt before going to the field.

The theodolite was a strange instrument for Reggie. There were so many names for the different parts – foot screws, tangent screws capstan headed screws, slow motion screws, transit axis, line of collimation, upper plate, lower plate, cross hairs, “A” vernier , “B” vernier, plate levels, etc ., etc. Reading the vernier was another tricky thing. Once a classmate of his, trying to read an angle, called Reggie and asked him to help him read the angle. Without bothering to do it, Reggie said “you just read the angle”. Without Reggie’s knowledge his instructor was standing close by at the moment and asked Reggie to go and read the weather report, if he wanted to “just read some thing”.

After finishing the chain survey plan he took it to the instructor with a proud heart. He gave the plan and stood close by, for the praise which he thought was sure to come. The instructor glanced through the plan, and without even raising his head said “you won’t get any marks for this“. His pride shattered Reggie come back and re-drew the plan.

On the day he really started Block Surveys, Reggie was full of excitement. With pencil and paper in hand, and five labourers following him, Reggie went to prospect the area. With the tracing he, had found, it difficult to locate the boundaries, but with a lot of wailing he ultimately for them. Sometimes standing and sometimes seated on rocks he finished drawing the prospection diagram.

It did not take a long time for Reggie to realize that the theodolite could be used for many other purposes then for which it was intended. Life dragged on till one day he found that he has completed the survey of his block.

He drew the plan, and while doing this, learnt a new word – fudging. Fudging made line plotting easy as anything, till one day a Surveyor who had come for recess told him that Reggie will have to drop that word and the practice too in the training school itself- before coming to the field as a Surveyor. This advice brought to his mind the first lecture he listened to in the training school. "Always remember" lectured the senior instructor on the very first day, "that you can never do any dishonest work in this department. Dishonest work will come tracking you just like your own shadow. There is no escape". How true these words are pondered Reggie, and on the day his instructor checked his plan, he fully realized that there was no escape.

Levelling tracing, interpolation of contours, and plane tabling came to and end as time marched on. Then the vacation came, and the final examination drew closer. With the "Standing Orders" opened in front of him, he is wondering what will happen to him at the final examination. When reading the orders regarding married quarters and rent allowance for married Surveyors, the memory of Leonie flashes through his mind. Yes Leonie his cousin. But that is an entirely different story."



A surveyor enjoy the club night at Divatalawa Celebration



Surveyor with so called surveyors' uniform at Field doing

***(Rest of the interesting flash back will continue in the next journal)***

## Pictures of Survey Department at 'Deyata Kirula' Exhibition 2012



Name Board of the Ministry of Land & Land Development



Background of the Survey Department's Stall



Surveyor General & Senior Officers at exhibition



Surveyor General & Senior Officers at exhibition



Exhibits



Exhibits



Exhibits



Stalls of the Ministry

Map Sales Lorry



Exhibits & Staff



Exhibits & Staff

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**“Nobody can go back and start a new beginning, but anyone can start today and make a new ending”.**

**Maria Robinson**

**“No man ever reached to excellence in any one art or profession without having passed through the slow and painful process of study and preparation”**

**“The mark of a true professional is giving more than you get.”**