

# Surveying: Profession And Professionalism

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## *Abstract*

*Surveying profession has been very dynamic in nature in recent times.. Like other professions such as medical, engineering, teaching, pharmacy etc., surveying profession has acquired its own dimension guided by functionalities and specification plus standard. A surveyor is a surveyor irrespective of nationalities, race and origin. Though development of technologies in the domain of surveying has of course necessitated surveyors of modern world to be more frequently updated in terms of skill and capabilities to adapt him/herself in the new environment, the basic objectives yet remains the same in the profession of surveying. Today anyone can assume him/herself being as a surveyor by just using the latest tools of earth observation but prior to proclaiming oneself as a surveyor, one must rethink whether the proclaimer inherits or holds the basic qualification in terms of education, professional requirement and his/her state's rule and regulation or law pertaining to the profession.*

## **Introduction**

It is very hard to say which is the derivative of what in between Profession and Professionalism. Professionalism may be the consensus developed through the gradual development of a profession. It may also be true that a vocational discipline required for the betterment of the society might have to be adopted for which there was necessity of certain criteria to be fulfilled for which the world professionalism might have been used prior to the former. In any case, for maintaining sustainable existence of a career in a scientific field, professionalism in regard to that career must be established so that the profession becomes standard, less ambiguous thereby making more people satisfied by giving better service to the clients.

Muzondo and Hodza have this view on a profession:

A profession is built on a policy of admitting educated person to small, self-governing bodies of their social equals, to whom they will personally be known and by whom their fitness would be judged. It derives from the phenomenon of division of labour, but having special power, prestige and knowledge specially importance to society.

To make a discipline as a profession, state's jurisdiction must declare it as a profession. State must set certain terms and condition for someone to be labeled as a professional. It can either be achieved through by defining certain academic standard in specific faculty or more effectively establishing a licensing system along with other requisites. Nevertheless, different countries have adopted their own different styles for defining somebody as a professional of a certain profession.

Land Surveying must be a licensed profession. Licensing and subsequent registration of Land Surveyors must be the subject of law of a profession. This must be availed in the governing law of the profession which must contains pertinent definitions and a code of ethics. It should not mere repository of guidelines for the practice of land surveying: causing to be a mere manual of practice.

In the modern society where many disciplines have overlapping activities, it must be precisely defined to recognize a surveyor, which must comes through the sense of professionalism. In the realm of engineering, an engineer pretends to be a surveyor but may not be by the constraints of terms in the definition. In this context the question "What is Survey?" comes prior to identify a Surveyor. The simplest answer may be "A survey helps to locate upon the ground that land which somebody's deed describes." It is because people recognize surveyor more by relation to land property than by other causes.

Then, immediately the next question rises? Who is

a surveyor? The answer of this question must be met prior to the establishment of professionalism in land surveying. A surveyor is the person who practices surveying and is required to have certain academic degree by passing through the defined examination related to the subjects. The surveyor must show the result of the subject such as licenses or other necessary documents at the time of demand by others while surveying.

International Federation of Surveyors (FIG) defines a surveyor as a professional person with the academic qualification and technical expertise to practice the science of measurement. The definition assumes surveying profession basically to be supported by skilled at the same time academically qualified human resources.

### **Background of Surveying Profession in Nepal**

Surveying as a profession began in Nepal at the time when the present day's Survey Department was established as a mobile survey office as a section of Land Registration office as an organization just to support on the cases of land related issues in 1957. By 1964, the unit had crossed a long profile when it had been institutionalized as Survey Department. The government of the time imposed the revolutionary Land Reform Programme when department at least recruited technical personnel trained by a short-period training course as demanded by the cadastral mapping. Since then the scope of surveying gradually expanded and has reached to highly diversified level within the sector till date. The credit for the evolution of 'Surveying and Mapping Profession' basically goes to Survey Department, which had Survey Training Centre (STC) under its umbrella, established at the time for generating field survey expert for cadastral surveying. The training centre conducted Land Surveying related course by bringing expert from Survey of India.

Basically, the training comprised of chain surveying, compass surveying and plane tabling which are the classical approaches of surveying. The training centre only focused to generate manpower to fulfill the requirement of human resources within the Survey Department.

Later as the concept on land changed from simply agro-based to other land use based, people become more aware on the precision and accuracy of the measurement. In this scenario, the technical expertise generated by the

classical courses of survey training Centre did not meet the demand of skilled human resources. Recognizing this fact, Survey Training Centre started to conduct three level courses to generate different level of surveyor in terms of expertise such as basic Surveyor (Amin), Junior Surveyor and Senior Surveyor.

By then, the STC produced many Senior Surveyors who were capable in this field and helped to replace entire existing alien survey expert. To enhance the scope of the surveying practice, later the survey-training center was changed to Land Management Training Centre (LMTC) as a central organization and became independent from the survey department, which is giving training to trainees from different organization in different disciplines such as surveying, GIS, Land Administration etc. There have been courses up to Master Level in the Faculty of Geography in Tribhuvan University which somewhat has become supportive in Surveying. Academic Engineering Sectors such as civil, etc. comprised surveying courses in their curriculum. There have been many other government registered educational organizations in geo-informatics discipline in different parts of the country which are producing basic and junior level surveyors which indicates silver lining for better future of surveying profession in the country. Recently, Himalayan College of Geomatic Engineering of four academic years has been established to produce survey engineers in Kathmandu under Purwanchal University.

By the time, Survey Department widened its wing into many branches. Topographical, Geodetic and Cadastral survey branches remained as the major components of the survey Department. Nowadays, some more organizations such as National Geographic Information Infrastructure, Land Use Project, Department of Land Information and Archive have been established which are related to surveying profession.

Many Hydropower companies, government Agencies such as Department of Irrigation, Water Induced Disaster Prevention, Water and Sanitation, Forestry, Road, Land registration, Mines and Geology, Judicial agencies, real estate, municipalities etc demand for surveyors in Nepal. There have been many private organizations, which demand professional surveyors for land surveying and mapping. Apart from the existing base map of medium and smaller scales, we do have to make avail large scale maps since

topo maps at large scale are used in micro level studies and are useful in the actual implementation of project assignment. For this, there is a growing demand of surveying profession. Moreover, Survey Department has planned the establishment of digital cadastral system, which will demand many more surveyors. It is no doubt that with more peaceful environment prevailing in the country, more scope of survey profession become. By now, many of the Nepalese expert surveyors are working abroad in their profession lured by the motivative conditions offered by their respective organizations.

### **Modern Days of Surveying Profession**

Surveying is one of the oldest professions, known to be originated in the Babylonian times 2500BC. It has been found that in 1400BC, Egyptians used surveying to accurately divide land. With the industrial revolution in 1800AD, surveying was brought into prominent position with demand for 'accurate' boundaries and for public improvements (Muzondo et al).

Impact of changes in Information and communication technology has made rapid changes in the techniques and procedures of Land Surveying. Today's Surveying is not only limited to measuring tape, theodolite and plane table. Scenario has changed from the ground data acquisition from actual field observation to spatial database management through different spatial data and database modeling techniques. As a result, the proper definition of surveying profession has seen a shift towards incorporate changing requirements in technology and procedures. The greatest impact in the surveying profession has been made by development of spatial information system by making easy acquisition of spatial data and their processing.

When the Author asked to the Assistant Professor Dr. Arbinda Tuladhar of International Institute For Aerospace Survey and The Earth Sciences (ITC), the Netherlands, in 2001: "Why the Institute is not emphasizing studying on real ground observation and surveying as in the past during these days?", the answer was "Due to change in technology and profession, it has been necessary to accommodate all those new things developed from ground to Space. Data has not simply been data but now database and its management. There is not coordinate of points but voluminous amount of data in Remote Sensing imagery and raster files." And while these answers are still reverberating, the maps of bygone days now turned into elements of Geo-information Infrastructure. And there are

less desktop GIS more towards a corporate GIS [6].

Everywhere in Surveying, there is digital. Even if we force to limit Surveying to Field Observation and Map making, we must have to face digital Total Station, GPS and remote sensing for which one must have knowledge more than the of classical approaches. Then there comes the stage of data processing, data analysis and visualizations and finally data storage and serving or dissemination. To simplify procedures within different steps, many technologies has been incorporated.

### **Present status of surveying profession in Nepal**

Nepal cannot remain untouched with the changes in the outside world. It has also accommodated new technology in data acquisition methods by incorporating GPS and total station. Updating of data is being done using remote sensing imagery in the survey department. Topographic maps are being disseminated in the form of spatial database as well. Concept of Meta Data has been totally applied while serving the data. General people and specific users are more interested to the result of new technologies than the mere analogue maps. Many laymen who do not know about surveying have been found to be interested on Google Earth website just by virtue of its web page displaying Satellite imagery. Most of the organizations have possessed GIS tools for turning data into information efficiently.

Piloting of NGII with 39 stakeholders (Including CBS's district level offices) in the initial stage at least proves that there has been a shift in the vision as to the profession of Surveying simply from the ground work. Large numbers of surveyors are seen to be updating themselves by having professional training in GIS, GPS and remote sensing nowadays in Nepal.

Whatever be the modern technology, we have not been able to discard the classical approaches of data acquisition totally. In one hand, we have at least stepped for NGII whereas on the other hand we are using plane table for data acquisition in cadastral mapping. This seems to be paradoxical. There are many surveyors who are working remote areas either in government job or in the private form. For this, all of the survey professional organizations should initiative steps not only to upgrade the system with view of adapting new technology for better measurement, precision and result but also to maintain the integrity of the surveying profession.

## Organization involved in surveying job

There are many organizations those generates survey products either for their clients or for general users. In most of these organizations, they appoint surveyor or hire for surveying purpose only. Government organizations, Private sectors, NGO's and INGO's have their own specific jobs related to Surveying profession in some way. Some of the organizations offering surveying or survey related performance have been indicated below.

- i. Survey Department
- ii. Land Management Training Centre
- iii. \*Tribhuwan University and others (Geography, Geology, Civil engineering Department)
- iv. \*School of Geomatics and Himalayan College of Geomatics Engineering and others
- v. Land Registration Department
- vi. National Planning Commission
- vii. Department of Irrigation
- viii. Department of water Induced disaster and prevention
- ix. Municipalities
- x. Department of Housing and Urban Development
- xi. Department of Mines and geology
- xii. Department of Road
- xiii. Department of Forestry
- xiv. Judicial organizations (Courts)
- xv. Nepal Electricity Authority
- xvi. Department of Soil Conservation
- xvii. Department of Tourism
- xviii. Department of Local Development
- xix. Nepal Army
- xx. Nepal Police
- xxi. All Civil engineering Projects
- xxii. All Hydro Power Projects
- xxiii. All Hydro Power Agencies( Sanima Hydro power, Butwal Power Company, Chilime Hydropower etc.)
- xxiv. Central Department of Statistics
- xxv. Nepal Water Supply Corporation
- xxvi. Nepal Telecom
- xxvii. UNDP
- xxviii. ICIMOD
- xxx. JICA
- xxxi. DFID

- xxxii. FUND BOARD
- xxxiii. Road Board
- xxxiv. GTZ
- xxxv. Care Nepal
- xxxvi. IRAD
- xxxvii. ICON
- xxxviii. AutoCarto Consult
- xxxix. GeoSpatial Nepal..... etc.

There exist many other academic survey institutes and some universities, which have incorporated surveying profession along with other disciplines in their faculties.

## Manpower

Although the number of organizations involving with survey related tasks have been indicated significantly in the above list of organizations, the major organization for the surveying professionals have been only the survey department in Nepalese context. Most of the manpower has been produced by Land Management Training Centre (Previously, Survey Training Centre) whereas majority of those in the managerial level have acquired academic degree from different international institutions abroad. But due to lack of academic courses in the academic institutes, the profession of surveying has not gained that attraction, as it has to be with other engineering profession. If Survey Department implements the attractive long-term programme as indicated in the Logical Framework submitted by the Think Tank, then definitely it needs more number of survey professionals to materialize the envisaged plan. The total number of postings available in the Survey Department for surveying profession is 2701 starting from the Director General to the Basic surveyor.

## Provisions in Nepalese Law Regarding Survey Profession

Nepal has done many things in the field of surveying for developing it as a profession. More needs to be done for making this profession recognized better. There is a separate line for surveying professional in the government service. Surveying expert having specified qualification can compete for the survey related job where they can be assigned their job in the surveying sector within engineering service.

The provision in the Land Survey and Measurement Act / Regulation allow for licensing of Surveyors in different categories. However, the implementation has not yet been

completed.

Recently, government of Nepal has recognized newly emerging technologies such as GIS, digital Cartography, and remote sensing as inherent part of the surveying profession. Personnel of the survey department having acquired their degree in GIS, Geoinformation Management, Land Administration and Cartography from abroad has been recognized for further competition in their profession in the government service.

### **Professional Associations**

There have been many professional organization established to secure and promote the surveying profession in Nepal. These organizations are also seen to be engaged to highlight the research findings through the medium of conferences, workshop and seminar. They have categorized their membership into general member, life member and executive members. These organizations more or less conduct functions of survey aware activities. Following are the major organizations related to surveying.

- i. Nepal Surveyor Society (NSS)
- ii. Nepal Surveyor Association (NSA)
- iii. Nepal Remote Sensing And Photogrammetric Society (NRSPS)
- iv. Nepal GIS Society (NEGISS)
- v. Action Group for Geoinformation Nepal (AGGIN)

Out of these organizations, some discussions are going onto merge the Nepal Surveyor Society and Nepal Surveyor. But it is unfortunate that Nepal Surveyor Society has remained dormant for a long period. Nepal Surveyor Association has at least shown some activities that at least call for surveyor into a platform. It is realized Nepal Surveyor Association perform more activities to preserve the integrity and enhance dignity of surveyors working in different parts of the country. Nepal Remote Sensing And Photogrammetric Society has recently organized a seminar to raise awareness about the profession. There are around 1500 members in Nepal Surveyor Association as obtained from the source of the organization where as NRSPS has only about 50 members within its organization.

Nepal Remote Sensing And Photogrammetric Society has also acquired membership from international Organizations such as ISPRS respectively. Survey  
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Department has acquired membership from FIG. National Geographic Information Infrastructure, Survey Department is the member of Global Spatial Data Infrastructure Association.

### **Ethics and code of conduct**

A profession sustains if it possesses ethical values and code of conduct. Famous Pennsylvania Society of Land Surveyors assumes the following practices are supposed to be unprofessional and such action is against the professional dignity of a Land Surveyor, which is relevant for all land surveyors.

- a. To act for his/her client or employer in professional matters other than as a faithful agent or trustee, or to accept any remuneration other than his stated recompense for services rendered.
- b. To attempt to injure falsely or maliciously, directly or indirectly, the professional reputation, prospects or business of anyone.
- c. To attempt to supplant another land surveyor after definite steps have been taken toward his employment.
- d. To compete with another land surveyor for employment by the use of unethical practices.
- e. To review the work of another land surveyor for the same client, except with the knowledge of such land surveyor, or unless the connection of such ... land surveyor with the work has been terminated.
- f. To attempt to obtain or render technical services or assistance without fair or just compensation commensurate with the services rendered: Provided, however, the donation of such services to a civic, charitable, religious or eleemosynary organization shall not be deemed a violation.
- g. To advertise in self-laudatory language, or in any other manner, derogatory to the dignity of the profession.
- h. To attempt to practice in any other field in which the registrant is not proficient.
- i. To use or permit the use of his professional seal on work over which he was not in responsible charge.
- j. To aid and abet any person in the practice of land surveying not in accordance with the provisions of this act or prior laws.

It has been studied that a profession is said to have six characteristics, each of which is in fact true of land  
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surveying:

1. A theoretical base—measurement theory (the "science" of surveying) and boundary law (mainly the rules of construction).
2. A practical need—jurisdiction over the land by means of a cadastral system and its orderly development by means of land and geographic information systems.
3. A competence to satisfy that need—the knowledge, skill and experience acquired by formal education, informal training and the imitation of expert practice.
4. A legal sanction for the competence—licensing and registration, primarily by a state's Bureau of Occupations and Professions.
5. A standard of practice—the common use of the competence, to which a manual of practice prepared by a professional society may serve as a guide.
6. A code of ethics—a tabulation of beliefs, responsibilities or values either enacted into statute or advocated by members of a professional society

### Technology and Challenges

The advancement in technology in the field of Geospatial data acquisition and data handling has been so rapid that is very difficult to keep pace with them by virtue of lack of resources in terms of human resources, finance and others. Technology has gone to space, which are not easily affordable to be adopted. Gradually the existing hardware components become useless by non-compatibility with the latest one. The process model, data structure along with the product structure is being changed as a result of the technology, which have been the major constraints for adaptability. It seems majority of the professionals are always out of date by the speed of change. In this situation, surveying professionals have to be very alert and very competitive to secure the professionalism. Especially, the scope of profession has become wider and has given more space by the impetus of the Geo-spatial Information technology and definitely has carried out the change in the identity of a surveyor and the very definition of surveying profession. In the present day, a surveyor is also assumed to have knowledge on

Web technology : for spatial data dissemination,  
Database management : for managing the spatial data,  
GIS : for Geo-information analysis,  
Cartography : for digital visualization of the

Programming : information,  
: for self-suited mass  
generation of geo-product  
out the data they acquire.

Hence, there is big challenge ahead of present day surveyor. But thanks to the ICT, it indeed have helped more to recognize a surveyor and enhanced surveying profession by facilitating tools of observation and analysis of the information than ever.

### Conclusion

Surveying should be a licensed profession. No person without surveying license should accept as surveyor. Code of conduct and ethical principle must be made prevailed among all of the surveyors. Surveyors must have flexibility of being changed with the change in the technology of their profession.

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