

# Topography and Cadastral Applications

Carmen Georgeta Dumitrache

**Abstract:** *Surveying or land surveying is the technique, profession and science to determine the exact position of terrestrial or three-dimensional points and distances and angles between them. These points are usually on the Earth's surface, and are often used to establish land maps and boundaries ownership or governmental purposes. In this paper I will make some analyze about topography and cadastral applications.*

**Index Terms:** Land, Cadaster, Topography, Surface Area

## I. INTRODUCTION

According to the American Congress on Surveying and Mapping (ACSM) is the science and art of making all measurements essential to determine the relative position of points and / or physical details and cultural above, on or below the surface of the earth, and to describes in a usable form, or to determine the position of points and / or details. In addition, as alluded to above, a type of surveying known as "surveying the earth" (also on ACSM) is detailed study or inspection, as the collection of information by means of observations, measurements field surveys, research or legal instruments, and data analysis to support planning, and establishing property boundaries.

This involves re-creating polls cadastral and land boundaries based on documents of record and historical evidence and surveys certification (according to the statute or ordinance local) of plats subdivision / maps, studies registered land, judicial investigations, and space delimitation. Land surveying may include related services such as mapping and related accumulation of data, surveys aspect of construction, precision measurements of length, angle, elevation, area, and volume and degree horizontal and vertical control, analysis and land use survey data.

## II. TOPOGRAPHY

Measuring was an essential element in the development of human environment since the beginning of recorded history (5,000 years). It is necessary in the planning and execution of almost any form of construction. It's most familiar modern uses are in transport, building and construction, communications, mapping and define the legal boundaries of land ownership.

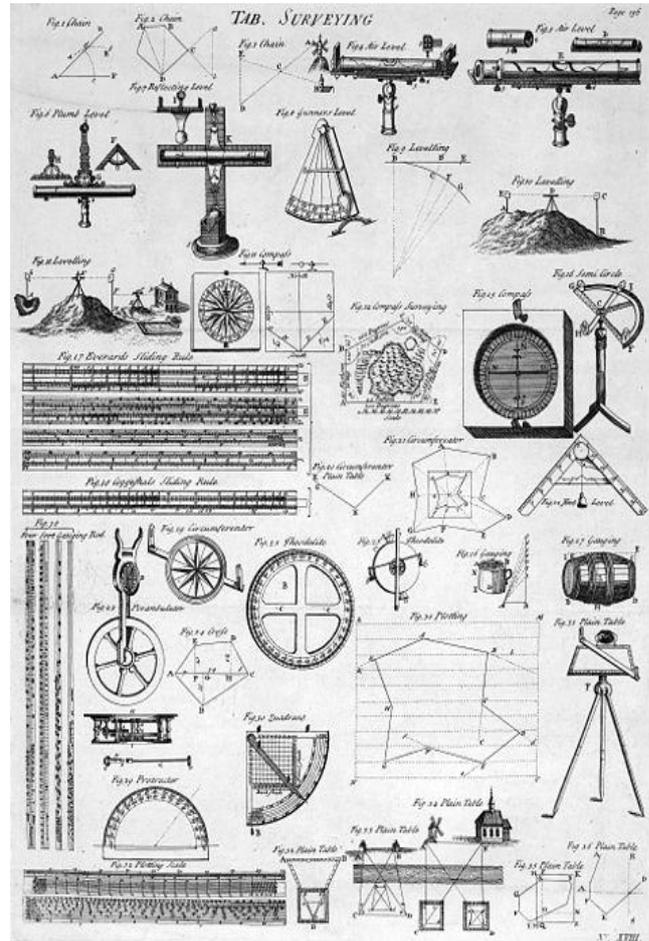


Figure 1- Table of Topography 1728 Cyclopaedia

Historically, the distances were measured using a variety of means, such as chains having links with a known length, for example, by Gunter chain, or the measurement strip of steel or Invar.

To measure the horizontal distances, these chains or tapes were drawn on the temperature reached, to reduce sagging and weak. In addition, try to keep the measuring instrument will be. In the case of measurement on a slope, the inspector would be to "break" (break chain) measurement using a smaller increase than the total length of the chain. Historically, horizontal angles were measured by caliper, which would provide a magnetic bearing of which deflections could be measured.

This type of instrument was later improved by more closely described discs providing better angular resolution and by mounting telescopes with reticles for more precise observation above the disc (see theodolite). In addition, levels and circles calibrated to measure vertical angles were added, with Verniers measuring a fraction of a degree, so that, with a turn-of-the-century transit.

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**Figure 2. Compass**

A standard Brunton Geo compass, still used commonly today by geologists and land surveyors based measurements.

The simplest method for measuring height is with an altimeter - basically a barometer - air pressure using as an indication of height. But surveying requires greater precision. A variety of means, such as precise levels (also known as differential leveling) have been developed to do this.

### III. CADASTRAL APPLICATION

The precise leveling, a series of measurements between two points are taken using a measurement instrument and a rod. The spread between the height measurement and decreases are added in a series to obtain the net difference in elevation between two terminals of the series. With the advent of the Global Positioning System (GPS), the altitude can be also derived with sophisticated satellite receivers, but usually with less accuracy than traditional precise leveling. However, accuracy can be similar, where traditional leveling should be run a long distance.

The triangulation is another method of horizontal location made almost obsolete by GPS. The method of triangulation, distances, directions between objects increases and the greater distance from each other can be determined. Since the early days of surveying, it was the main method of determining the correct position of objects for topographic maps of large areas. An inspector first need to know the horizontal distance between two object and then height, distance and angular position of other objects can be derived, as long as they are visible from one of the original objects. The high precision transit or theodolites were used for this, and angles of objects were measured repeatedly for increased accuracy.



**Figure 3 - Example of modern surveying equipment (Field Map technology) GPS, laser rangefinder and computer field allows surveying and mapping (creating real-time map) and field data collection.**

Switching is a term used when referring to the move to take a shot of altitude in a different location. When land surveying, there may be trees or other obstructions blocking the view from level to level rod gun. In order to "transform" weapon level, first take a picture porridge rod from your current location and share records. Keeping dipstick in exactly the same location and altitude can move level weapon in a different location where the dipstick is still visible.

Record new listing seen in the new location of the stem level and use the difference to find the rate increases new weapon level. Starting is only used when there are obstacles, but also when changing drastically increases. You can turn up or down in elevation, but the gun must always be positioned higher than the base of the stem. A rod level can be usually up to 25 meters high, which allows the gun to be set much higher.

However, if the gun is less than the base of the stem, you will not be able to take a chance, because the rod cannot be lowered beyond the quota ground. The basic principles of surveying have changed little over the centuries, but the tools used by surveyors have evolved enormously.

Engineering, especially civil engineering, depends heavily on surveyors. Whenever there are roads, railways, reservoir, dams, retaining walls, bridges or residential areas to be built, surveyors are involved. They set limits legal descriptions and limitations of various lines of political divisions. They also provide advice and data for geographic information systems (GIS), computer databases containing data on soil characteristics and limitations.

The inspectors must have a thorough knowledge of algebra, basic calculus, geometry, and trigonometry. They must also know the laws dealing with surveys, property, and contracts. In addition, they must be able to use delicate instruments with accuracy and precision.

In the United States, surveyors and civil engineers use units meters in a foot survey is broken down into 10ths and 100ths. Many deed descriptions requiring distance calls are often expressed using these units (125.25 ft). On the subject of precision inspectors are often held to a standard of one hundredth of a foot; about 1/8 inches. Calculation and mapping tolerances are much smaller wherein achieving near-perfect closures are desired. Though tolerances such as this will vary from project to project, field day to day use beyond 100 years of a leg is often impossible. In most of the United States, surveying is recognized as a distinct profession apart from engineering.

Licensing requirements vary by state, but generally components of education, experience and examinations. In the past, the experience gained through an apprenticeship with a series of passing state administered exam was necessary to achieve licensure. Now, most states insist upon basic qualification of a degree in surveying, plus experience and examination requirements. Licensing process usually follows two phases. First, upon graduation, the candidate may be eligible to take the Fundamentals of Land Surveying exam, to be certified in meeting and fulfilling all other requirements as an inspector in training (SIT). On being certified as an SIT,

The candidate then needs to gain additional experience to become eligible for the second phase. This typically consists of Principles and Practice exam measuring land with a state exam specific. The licensed Inspectors usually indicates themselves with the letters PS (professional inspection), LS (inspector land), PLS (inspector tennis professional), RLS (inspector land registered), RPLS (Surveyor Registered Land Professional) or PSM (professional inspection and mapper) following their names, according to the dictates of their particular jurisdiction registration.

In Canada, surveyors are registered to work in their province. Designation for an inspector land decompose provincial, but following the rule that the first letter indicates the province, followed by LS There is also a designation as an inspector CLS or Canada land, which has the authority to work on land Canada, the reserves include Indian National parks, the three territories and offshore lands.

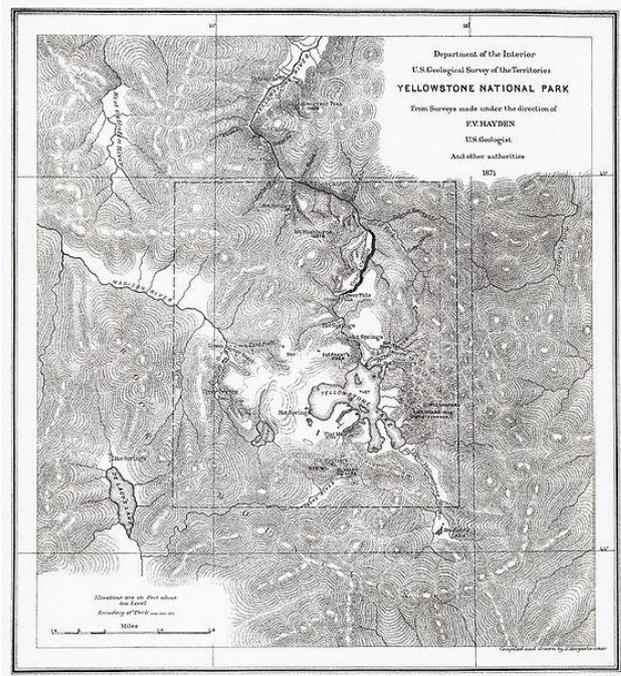
In many Commonwealth countries the Chartered Land Surveyor term used for someone who has a professional license to conduct inquiries.

A land surveyor license is usually required to sign and seal all plans whose format is dictated by their state power, which shows the name and registration number. In many states, when setting land boundary corners are also inspectors should place survey monuments bearing their registration numbers, usually in the form of iron rods covered monuments concrete nails and washers.

With the expansion of the European community, the profession of the building surveyor is becoming more known in other European countries, especially where many English-speaking people buy second homes. LIDAR topography - dimensional laser scanning offers high definition surveying architectural as-built and engineering studies. Recent technological advances make the solution more cost-effective and time-sensitive to provide the highest level of detail available for interior and exterior construction work. Job Land is to find and mark certain places on the field. A typical location of interest, for example, limits a person's property. This limit is described in legal documents and Land follows that description and locates limit physical land and its brands, so he knows what the land owner can legally use. As an example, such a legal description can refer to a point as 120.25 meters south of the existing brands. Inspector ground in this case will find existing marker and use measurement tools to find the point of 120.25 meters south of that and place a new marker at that location. These objects are called markers.

The documentation reference refers to actual physical points on the grounds that define the location of the boundary lines that divide neighboring parcels and their respective corners. Also called the control of the investigation, they are most often 1/2 "or 5/8" rods of iron rod or pipe located at the 18 "minimum depth These rods and / or tubes usually have a plastic cover applied wide top inspectors responsible. " name and license number. In addition to bars and tubes, inspectors often use 4x4 "posts concrete corners of large parcels or anywhere that would require greater stability (eg, sandy beach). They have held three meters deep. In places where there is asphalt or concrete is common to place nails or caps aluminum alloy corners limit re-establish.

The trademarks are designed to be durable, stable and "permanent" as possible. the aim is provide sufficient signal for some brands will remain for future restoration of borders.. In the United States , cadastral surveys are usually conducted by the federal government, in particular through the cadastral surveys branch of the Bureau of land management (BLM), the former Office fun are general (GLO). They consult with USFS, Park Service, Corps of Engineers, BIA, Fish and Wildlife Service, Bureau of Reclamation, etc. In countries that they were organized on Public System of Cadastral (plss) inspectors BLM cadastral surveys carried out in accordance with this system. A common use of a survey is to determine legal ownership limit. The first step in such a study is to research relevant title records such as deeds, documentation investigation (Trade field) and any public or private documents providing relevant data. In order to properly set the position of the markers in the investigation, the inspector must then take measurements. To do this, the inspector places usually a total station over different angles and distances on land records made by EDM.



**Figure 4. FV Hayden's map of Yellowstone National Park, 1871. Its investigations were a significant factor for establishing the park in 1872.**

#### IV. CONCLUSION

The Inspector analyzes the data and makes comparisons with existing records to determine evidence that can be used to establish border positions. Inspector calculated bearing and distance lines between border corners and total station positions and uses them to determine and mark the corners of the field. He can verify measurements by measuring directly between sites using a flexible tape. Many properties have considerable problems regarding improper framing miscalculations in past surveys, titles, easements, and wildlife crossings.



## Topography and Cadastral Applications

Also, many properties are created from multiple divisions of a larger over the years, and with each additional division increase the risk of miscalculation. The result can be abutting with adjacent parcels properties do not coincide, resulting in hiatuses (gaps) and overlaps. Art plays a role when an inspector must solve a puzzle using pieces that do not fit together exactly. In these cases, the solution is based on research and interpretation controller, together with the procedures established to resolve discrepancies.

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