

## Chapter 1 Introduction

## 1-1 Definition of Surveying

"...the art science and technology of determining the relative position of point above, on, or below the earth's surface, or the establishing of such points."

"...that discipline that encompasses all methods of measuring and collecting information about the physical earth and its environment, processing that information, and disseminating a variety of resulting products to a wide range of clients."

Been around since the beginning of time primarily in the form of navigation, mapping, boundary and construction.

## International Federation of Surveyors

"...Practice of the surveyor's profession may involve one or more of the following activities which may occur either on, above or below the surface of the land or the sea, and may be carried out in association with other professionals:

Determine the size and shape of the earth or portions of the earth.

Position and monitor objects on, above or below the surface of the earth.

Determine boundaries

Design, establish, and administer LIS and GIS.

Study of natural and social environment relative to urban and regional planning.

Planning development of property.

Planning, measurement and management of construction works.

Production of maps, files, charts and reports.

In the applications of the foregoing activities, surveyors take into account the relevant legal, economic, environmental, and social aspects affecting each project."

## State of California – Land Surveyors Act

## 8725. Necessity of license

Any person practicing, or offering to practice, land surveying in this state shall submit evidence that he or she is qualified to practice and shall be licensed under this chapter.

It is unlawful for any person to practice, offer to practice, or represent himself or herself, as a land surveyor in this state, or to set, reset, replace or remove any survey monument on land in which he or she has no legal interest, unless he or she has been licensed or specifically exempted from licensing under this chapter.

## 8726. Land surveying defined

A person, including any person employed by the state or by a city, county, or city and county within the state, practices land surveying within the meaning of this chapter who, either in a public or private capacity, does or offers to do any one or more of the following:

(a) Locates, relocates, establishes, reestablishes, or retraces the alignment or elevation for any of the fixed works embraced within the practice of civil engineering, as described in Section 6731.

(b) Determines the configuration or contour of the earth's surface, or the position of fixed objects thereon or related thereto, by means of measuring lines and angles, and applying the principles of mathematics or photogrammetry.

(c) Locates, relocates, establishes, reestablishes, or retraces any property line or boundary of any parcel of land, right-of-way, easement, or alignment of those lines or boundaries.

(d) Makes any survey for the subdivision or resubdivision of any tract of land.

For the purposes of this subdivision, the term "subdivision" or "resubdivision" shall be defined to include, but not limited to, the definition in the Subdivision Map Act (Division 2 (commencing with Section 66410) of Title 7 of the Government Code) or the Subdivided Lands Law (Chapter 1 (commencing with Section 11000) of Part 2 of Division 4 of this Code).

(e) By the use of the principles of land surveying determines the position for any monument or reference point which marks a property line, boundary, or corner, or sets, resets, or replaces any such monument or reference point.

(f) Geodetic or cadastral surveying. As used in this chapter, geodetic surveying means performing surveys, in which account is taken of the figure and size of the earth to determine or predetermine the horizontal or vertical positions of points, monuments, or stations for use in the practice of land surveying or for stating the position of geodetic control points, monuments, or stations by California Coordinate System coordinates.

(g) Determines the information shown or to be shown on any map or document prepared or furnished in connection with any one or more of the functions described in subdivisions (a), (b), (c), (d), (e), and (f).

(h) Indicates, in any capacity or in any manner, by the use of the title "land

surveyor” or by any other title or by any other representation that he or she practices or offers to practice land surveying in any of its branches.

(i) Procures or offers to procure land surveying work for himself, herself, or others.

(j) Manages, or conducts as manager, proprietor, or agent, any place of business from which land surveying work is solicited, performed or practiced.

(k) Coordinates the work of professional, technical, or special consultants in connection with the activities authorized by this chapter.

(l) Determines the information shown or to be shown within the description of any deed, trust deed, or other title document prepared for the purpose of describing the limit of real property in connection with any one or more of the functions described in subdivisions (a) to (f), inclusive.

(m) Creates, prepares, or modifies electronic or computerized data in the performance of the activities described in subdivisions (a), (b), (c), (d), (e), (f), (k) and (l).

Any department or agency of the state or any city, county, or city and county which has an unregistered person in responsible charge of land surveying work on January 1, 1986, shall be exempt from the requirement that the person be licensed as a land surveyor until such time as the person currently in responsible charge is replaced. The review, approval, or examination by a governmental entity of documents prepared or performed pursuant to this section shall be done by, or under the direct supervision of, a person authorized to practice land surveying.

#### 1-2 Geomatics

See Section 1-1 Introduction...another name for the same profession!

#### 1-3 History of Surveying

Egyptians in 1400 BC was known as “rope stretchers” used to mark out parcels and boundaries. Many great construction projects also.

Greeks 120 BC “Invented” geometry and surveying instruments for construction and mapping the world. Romans defined and developed surveying and surveyors (civil and military) tested, built and documented many surveying applications.

In 200 BC determined the circumference of the earth to be 25,000 miles. Present day technologies show it to be a larger. Determined earth to be an ellipsoid not a sphere. 13.5 miles larger at the equator than poles.

#### 1-4 Geodetic and Plane Surveys

Geodetic Surveying takes into the consideration the earth’s curvature

Plane Surveying considers the earth to be a flat surface.

#### 1-5 Importance of Surveying

Map Earth

Navigation

Boundaries

Develop data banks

Physical earth configure

Solar system

#### 1-6 Specialized Types of Surveys

Control

Topo

Aerial

Land, Boundary, Cadastral

Hydro

Route

Construction, Layout

Mining

Solar

#### 1-7 New Technologies for Surveying and Mapping

Electronic Total Station

GPS

Digital Photogrammetric systems

Computers

#### 1-8 Surveying Safety

Highways  
 Environment  
 Physical conditions (Inside or outside)  
 People

#### 1-9 LIS and GIS

New technology used surveyors, planners, engineers, environmentalist, business, transportation, etc.  
 Attaching data (numbers and information) to pictures (maps, photos, etc)

#### 1-10 Federal Surveying and Mapping Agencies

NGS  
 USGS  
 BLM  
 DOD and DMA  
 Army Corps of Engineers  
 CIA, FBI, Military

#### 1-11 The Surveying Profession

Successfully pass two licensing exams and have six years of professional level experience documented by four licensed professionals.

FLS (LSIT) 8 hour national exam. 170 multiple choice questions. You have two years of work experience or two years of education or a combination of the two.

PLS (LS) 8 hour state specific exam. 12 problems. and 25 take home questions. You must have six years of professional level experience and have previously passed the FLS exam in any state. If you have an AA/AS or Certificate in a two year program you may waive two years of experience. if you have a BA/BS or higher degree you may waive 4 of the 6 years. You still need four letters of recommendation.

Surveying is a learned profession  
 Wide variety of background in technical and professional experience  
 Thorough knowledge of math  
 Solid understanding of surveying principles, methods, instruments, technology, law, history, and judgement.  
 Business doesn't hurt either!  
 Code of ethics  
 Communication skills  
 Personal qualities are as important as technical abilities  
 Paid historian  
 Profession is a calling

#### 1-12 Professional Surveying Organizations

ACSM  
 NSPS  
 ASPRS  
 ASCE  
 CLSA  
 IFS (FIG)

#### 1-13 Surveying on the Internet

See the WEB addresses on page 19 of text.

#### 1-14 Future Challenges in Surveying

Advances in technology  
 Environmental impacts  
 Data management