



# WWC News



WWC's Helena, Montana office

## *What Do Surveyors Do?*

### What do Surveyors do?

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### **Introduction**

In preparation for a film for a land surveying society, the film crew took to the streets and asked the question, "What do surveyors do?" The responses were quite varied: "they stand by the side of the road holding a long stick", "have meetings over the hood of a truck", "have parties and put up a sign to tell people", "they tell them where to build stuff". All the responses are basically correct, but in most cases the respondents don't know any more than that about surveyors. The surveying profession has not been well recognized as an essential part of society, as are engineers and architects. Yet, virtually nothing new gets built from the plans that other professionals produce without knowing exactly where it fits into the scheme of things; the precise place to build.

### **Definition**

Are all surveyors qualified to carry out all surveying disciplines? The answer is: no. Whether the surveyor has completed four years in a surveying curriculum, has performed surveys for 30 years, or is a second year intern, none of them know it all, or have had the opportunity to work in the varied fields that require specific methods, equipment, precision and constraints. For instance, it would be foolish for a surveyor to attempt mine surveying when they have never been trained in the specifics of the methodology, or have never worked underground.

The State Board of Professional Engineers and Land Surveyors is the licensing authority for surveyors. State codes give a definition for a land surveyor. For both Wyoming and Montana the definitions are essentially the same: "Land surveyor' means a person who by reason of his knowledge of the mathematical and physical sciences, principles of land surveying and evidence gathering acquired by professional education and practical experience is qualified to prac-

tice land surveying as attested by his registration as land surveyor."

The main emphasis of licensing revolves around measuring land, or real property. All licensed surveyors are deemed to be competent to perform that type of surveying. Both Wyoming and Montana law also states that a licensed surveyor is not to perform surveys that they have not been trained in, i.e. that is out of their field of competence. In Wyoming, it is a violation if the license holder "has knowingly engaged in an act which the registrant knew was beyond the scope of his professional practice as evidenced by limitations on the registrant's right to practice, or insufficient education and knowledge, or inability to apply engineering or land surveying principles and skills."

Measurements are only a part of what a surveyor does, particularly when related to property boundary surveys. A licensed surveyor's mandate is to follow in the footsteps of the original surveyor, find the previous survey monuments, and determine if they are in the correct position and haven't been moved. If monuments are missing, their original positions have to be determined by specified methods. Monuments generally mark the boundary of two properties. Consequently, record research has to be conducted to ensure that the boundary lines are in agreement. A licensed surveyor is the only person legally able to determine the authenticity and accuracy of a previously set monument. Where there are conflicts, the surveyor can only report the evidence accurately enough for the courts to make the final determination, and quite often the surveyor's professional opinion helps the courts to make their ruling.

### **Types of Surveying**

Land surveys are the most common surveying practice that needs to be conducted or supervised by a licensed individual. There are many types of surveys that also require certification by a licensee, as well as merely being overseen by a practitioner, depending on client requirements. Building of bridges, roads, tunnels, railroads, dams, airport runways, and transmission towers



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### Land Surveyors—What Do They Do?

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are but a few. Some surveys require very precise positions, such as missile launch pads, dam generator placement, theme park rides, manufacturing tooling dies, and the like. Construction surveying often times does not require a licensed individual to be on the site or to oversee it, but the licensed person is the only one who can certify to the correctness, accuracy, and precision of the project. When one considers the complexity of certain construction projects, they can well see the absolute necessity of accurate surveys. Take Abu Dhabi for example, where an incredible infrastructure is being built. Almost everything one sees while driving a city street, anywhere, was quite possibly placed there under a surveyor's directions. Even the things we can't see, such as underground sewer, water, gas, and electrical lines have to be placed in specific designed positions, all marked by a surveyor.

### Methods of Surveying

It is no longer common to see two people stretching a metal tape between points, the predominant method used for many years. Accurate positioning depended on accurate measuring tools and competent people to use them. Whether it was the tape used for linear measurements or the survey instrument that measured angle directions, each had its purpose and its precision of accuracy. Today, many types of surveys are conducted with modern GPS technology. Has that taken the place of conventional surveying? Absolutely not! Total stations capable of determining accurate angles and distances are common tools that every surveyor needs for specific projects. Another modern survey instrument is a Robotic Total Station, where a single person can perform the work of a two to three man crew. Every survey instrument has its limitations and every project site

has certain conditions that limit instrument capabilities. The land surveyor needs to be adaptable and inventive. The surveyor might have to bring out the tape measure or revert to a simplified method invented on the spot to obtain correct and accurate data for that project.

### Conclusion

It is a common saying that no two surveyors can measure the same line and come up with the same exact distance. Exact in most cases is the same hundredth-of-a-foot reading. Most surveys are no closer than that. Some surveyors do not make certain of that fact, yet believe their measurements to be accurate. They certify to what their instrument measurement told them. From one day to the next, the same surveyor might not get the same exact answer between the same two points. Why? From day to day conditions change; a different temperature, a different atmospheric pressure, both of which effects how an infra red beam of light is reflected back to the instrument. Perhaps the helper holding the prism rod or GPS pole didn't have the leveling bubble right in the center when the reading was logged. Do surveyors make an atmospheric adjustment in their instrument every day? Not generally, unless they deem it to be a significant change, in either weather conditions or in altitude, which also has to be taken into account. The distance might be accurate but not precise, because they didn't take the necessary precautions. So, when you determine your need for survey work, make a decision on the individual or firm based on their field of expertise. If you need a mine surveyor, hire one who has done it before. Don't be afraid to ask for their credentials or experience.