



JOE SASS

Survey Monuments

Shaping Our World

Land Surveying is arguably one of the oldest professions in the world. Historians have deduced that the ancient Egyptians were among the first civilizations to use land surveying techniques while building the great pyramids. For both the ancient and the modern day construction projects, land survey monuments in the ground have been necessary for directing the movement of material, definition of boundaries and the placement of structures. You can walk onto any construction project today and find these marks. Some are temporary, others are more permanent. A practiced eye will have no problems locating these monuments and determining their probable purpose.

Land survey monuments come in many different forms, shapes and sizes and are designed for a variety of uses. Thousands of construction monuments are temporary and used for the purposes of moving dirt and building structures. These are generally pieces of wood staked into the ground with markings to indicate offsets and the amounts of dirt to be cut or filled. Due to the amount of staking that is required to describe a project being built, this is an expensive portion of most construction project budgets. One of the primary reasons construction companies have moved to machine control is the efficiency and accuracy which can be obtained by using GNSS while largely replacing the need for these wooden markers.

Some survey monuments are placed in convenient places with long sight lines



A surveyor hammering in a piece of wood lath on a job site describing offsets, the amount of material to cut or fill and the point identification.

over which a surveyor can set up his instrument for construction and cadastral land measurements. These are often nails or spikes driven into a street and highlighted with a splash of spray paint.

Throughout most countries of the world, there are government monuments which describe the division of states, provinces, counties, cities and individual properties. These monuments range from private land surveyors' license number stamped onto the top of rebar to so-called "brass caps." These can be the most interesting to find since they are often marked with a date and the jurisdiction that placed the monument. These markers also tend to have an

identification name or number stamped on it which can then have their lineage traceable on the internet.

Many monuments describe some place and also serve as a decoration. Mitad del Mundo on the equator in Ecuador is an observation tower while also a monument to the middle of the world. In actuality, this line misses the true equator as determined by GNSS technology by about 240 meters. However, Mitad del Mundo was calculated over 250 years ago by French geodesists. If this had been a traverse from the pole to the equator, they would have had an accuracy ratio of 1 in 40,000 which is quite acceptable by most survey standards.



A nail in the middle of a street. TBM – (Temporary Bench Mark). These points are marked for specific projects and generally have good site visibility with long sight lines.



A “Brass Cap” marks this permanent monument installed by the Canadian government in 1984. The dimple that can be seen in the center of the disk marks the specific location that has been measured and recorded.



Unfortunately, many land survey marks are molested or destroyed during construction projects and cannot be easily or inexpensively replaced. Monuments intended for permanent use can get dislocated by the heavy machinery involved on most construction sites. When possible, a monument should be preserved, and when that is not possible, a land surveyor should be involved in its removal and replacement (if necessary) during the project cycle.

Today’s monumentation often utilizes GNSS technology and are what

Mitad del Mundo, the Middle of the World in Ecuador is marked by an observation tower, scientific exhibits and touristic presentations. This line was determined by French surveyors over 250 years ago.



the government calls “passive monuments.” These Continuously Operating Reference Stations (CORS) create virtual and real locations that are more accurate than previous surveying techniques on a global basis. For the first time in the history of the planet, these CORS allow the earth to be mapped in a single datum, the World Geodetic System of 1984 (WGS84) with precise locations determined by thousands of these units covering all the continents.

Throughout the world, these markers, monuments, CORS, brass caps and nails in the ground have a story to tell. Some had elaborate presentations; some had to be hard earned through tough passage to remote places. Others attest to heights obtained while others mark the lowest spots on the planet. It has been a hobby of mine for many years to collect pictures of these various testaments. If you have any images you would like to share, I invite you to send them to me at GNSSJoe@gmail.com. ☐

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Continuously Operating Reference Stations, or CORS like the one seen here are passive monuments. Thousands of these types of stations surround the globe providing real-time and post-mission data for high accuracy positioning.