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**CIVIL ENGINEERING**

**CVE 310**

**ENGINEERING SURVEY 2**

1. **BENEFITS OF GPS OVER OTHER FORMS OF EQUIPMENT FOR MEASURING**

**GPS** stands for **Global Positioning System,** and it uses signals from satellites to pinpoint a location on the Earth’s surface. In addition to transmitting information about location, GPS can provide data about velocity and time synchronization or various forms of travel.

**GPS** uses at least 24 separate satellites in a system that consists of six Earth-centred orbital plans, each having four satellites.

The benefits of GPS over other forms of equipment for measuring include:

* It offers a higher level of accuracy than any other equipment used in measuring.
* Calculations are made very quickly and with a high degree of accuracy.
* GPS technology is not bound by constraints such as visibility between stations.
* Land surveyors can carry GPS components easily for fast, accurate data collection, in other words, the GPS is portable than other measuring equipment.
* Some GPS systems can communicate wireless for real-time data delivery.
* The GPS is less costly and time consuming than other equipment for measuring.

1. **TYPE OF ERRORS ASSOCIATED WITH ABSOLUTE GPS POSITIONING MODE**

There are numerous sources of measurement errors associated with the GPS performance. The sum of all systematic errors or biases contributing to the measurement of error is referred to as **range bias**.

The GPS errors associated with absolute GPS positioning mode are:

* **Clock Stability**

GPS depends on accurate time measurement. GPS satellite carry rubidium and caesium time standards that are usually accurate to 1 part in 1012 and 1 part in 1013, respectively, while most receiver clocks are accurate by quartz standard accuracy of 1 part in 108.

* **Satellite orbits**

Slight shifts of the orbits are possible due to gravitational forces. The sun and moon have a weak influence on the orbits thus, resulting error being not more than 2m.

* **Satellite Error**

Slight inaccuracies in time keeping by the satellite can cause errors in calculating positions. Satellite can drift slightly from their predicted orbits which contribute to error.

* **Multi-path Error**

As the GPS signal finally arrives at the earth’s surface, it may be reflected by local obstructions before it gets to the receiver’s antenna.

* Receivers noise
* Selective availability
* Anti-spoofing
* Atmospheric delays