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Study of Real Time Kinematica Survey with Differential Global Positioning System

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Abstract: *Surveying is the art and science to determine the three dimension position of point and the distance and angle between them .There are different instrument for measuring the point, one of them is Differential Global Positioning System. Differential Global Positioning Systems (DGPS) are enhancements to the Global Positioning System (GPS) which provide improved location accuracy, in the range of operations of each system, from the 15-meter nominal GPS accuracy to about 10 cm in case of the best implementations. There are mainly two method 1.Real Time Kinematica, 2.Post Processing Method.*

Key Words: **Differential Global Positioning System, Real Time Kinematica, Post Processing Method**

1. INTRODUCTION

Real Time Kinematic (RTK) positioning is a satellite navigation technique used to enhance the precision of position data derived from satellite-based positioning systems (global navigation satellite systems, GNSS) such as GPS, GLONASS, Galileo, and BeiDou. The distance between a satellite navigation receiver and a satellite can be calculated from the time it takes for a signal to travel from the satellite to the receiver.

2. NEED FOR STUDY

For improvement of technique of surveying because the time taken by DGPS is less than the traditional method and. or More accurate surveying

3 OBJECTIVE

a. To study the Real time kinematica method with the differential global positing system (DGPS).

b. To improve the accuracy of survey and time taken by survey.

4. ERROR IN DGPS

a. Satellite ephemeris errors

b. Tropospheric errors

c. Ionospheric errors

d. Lack of indivisibility of satellites

5. Methods for reducing the error in DGPS

5.1. Real time Kinematic (RTK)

Real Time Kinematic (RTK) positioning is a satellite navigation technique used to enhance the precision of position data derived from satellite-based positioning systems. In practice, RTK systems use a single base station receiver and a number of mobile units. The base station re-broadcasts the phase of the carrier that it observes, and the mobile units compare their own phase measurements with the one received from the base station. There are several ways to transmit a correction signal from base station to mobile station. The most popular way to achieve real-time, low-cost signal transmission is to use a radio modem, typically in the UHF band. In most countries, certain frequencies are allocated specifically for RTK purposes. Most land survey equipment has a built-in UHF band radio modem as a standard option. RTK provides accuracy enhancements up to about 20km from the base station.

The distance between a satellite navigation receiver and a satellite can be calculated from the time it takes for a signal to travel from the satellite to the receiver. To calculate the delay, the receiver must align a pseudorandom binary sequence contained in the signal to an internally generated pseudorandom binary sequence. Since the satellite signal takes time to reach the receiver, the satellite's sequence is delayed in relation to the receiver's sequence. By increasingly delaying the receiver's sequence, the two sequences are eventually aligned. RTK follows the same general concept, but uses the satellite signal's carrier wave as its signal, ignoring the information contained within. RTK uses a fixed base station and a rover to reduce the rover's position error. The base station transmits correction data to the rover.

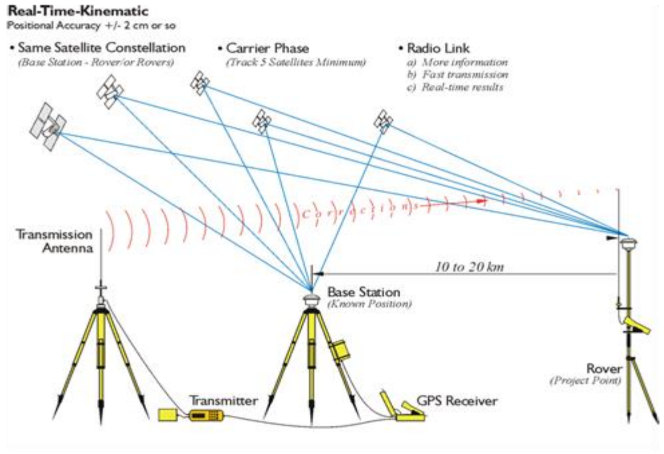

Fig-1 Real time kinematica
(Source: Google.com)

6. Methodology

6.1 Real time kinematica

Fig-2 Tippani

Sr No	Northing	Southing	Elevation	Marking
1	2540665	541325	56.721	
2	2540643	541304	56.824	
3	2540616	541246	57.86	STONE
4	2540646	541201	57.995	STONE
5	2540643	541074	60.616	STONE
6	2540654	540987	59.876	
7	2540676	540993	60.3	CHUNO
8	2540747	540993	60.733	
9	2540808	540995	61.001	STONE
10	2540814	540995	61.18	STONE
11	2540823	540992	61.226	TOWER
12	2540822	541230	57.669	TOWER
13	2540861	541250	57.782	TOWER
14	2540866	541256	57.727	STONE
15	2540866	541261	57.7	STONE
16	2540867	541261	57.689	STONE
17	2540870	541280	57.36	STONE
18	2540872	541282	57.833	STONE
19	2540793	541279	57.656	
20	2540726	541297	57.56	
21	2541556	540298	62.197	STONE
22	2541551	540299	62.212	STONE
23	2541558	540233	62.113	STONE
24	2541569	540169	61.102	
25	2541570	540122	61.926	
26	2541575	540036	63.46	STONE
27	2541687	539999	63.851	STONE

Table 1 Readings taken by RTK method

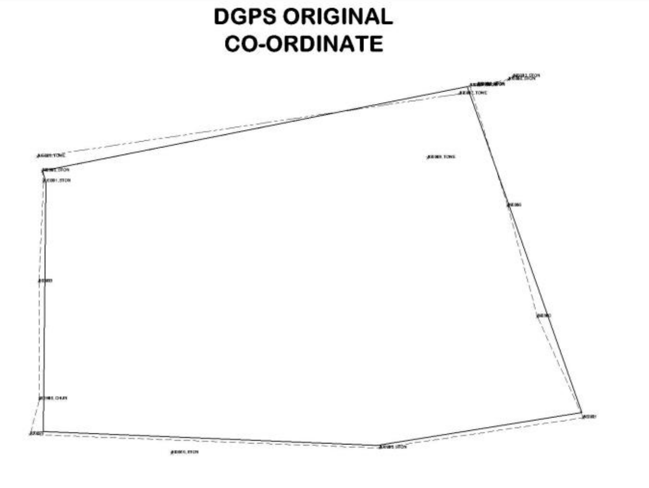

Fig 3 AutoCAD plan prepared from DGPS reading

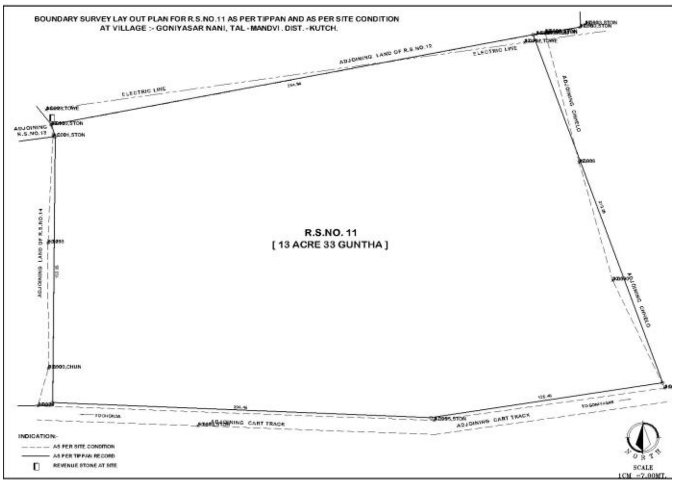

Fig 4 Comparison between tippani and DGPS plan

7. CONCLUSION

Speed of work with help of DGPS is more than the total station. DGPS reduces the human error because the part of settlement of line of sight is nullify in DGPS. DGPS only required open sky. Time take by DGPS is less than the total station. Maintance cost of DGPS is less than the total station. DGPS operated by a single person so man power usage is also decreases. Use total station during night is not possible, where as in the DGPS it possible to take reading during the night time.

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2 Differential Global Positioning System (DGPS) Operation and Post-Processing Method for the Synchronous Impulse Reconstruction (SIRE) Radar

3 DGPS SURVEY OF BOUNDARIES IN STATE FOREST DEPARTMENTS

BIOGRAPHIES

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