The Application of Computer Technology in Urban Survey

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Abstract. The computer measurement control system ensures the safe and normal operation of the equipment in urban survey. If we want the equipment to be able to contribute its own role in a long period of time, we must timely maintain the safety performance of the computer measurement control system to ensure its stability and security. Make the equipment better for urban measurement to provide more efficient, more favorable, more accurate service. With the development of computer technology, the experience of using computer technology in surveying and mapping circles at home and abroad shows that it has great advantages to process survey information by computer. In this paper, several of the most common computer technology used in urban survey are selected and discussed.

Keywords: Computer Technology, Urban Survey, Computer Application

1. Characteristics of computer application in urban survey

1.1. Necessity
To make full use of the information of urban survey, it has not only good social benefits, but also high economic benefits. It is difficult to meet the needs of management in modern society by using traditional means. The current situation is that the data of urban survey are all collected by people in the field by using the original method, and the drawings are completed by hand. As a result, the accuracy of graphics is poor, and the consumption of human, financial and material resources is large. There are various kinds of figures in urban survey, which are time-consuming, laborious and slow to calculate. For example, it is time-consuming and laborious to calculate the area of houses with various arc-shaped circular fan-shaped equilateral areas in the city¹(1) (Figure 1).
1.2. Superiority
Show a strong drawing and tabulation function, draw a variety of graphics, to meet the needs of different aspects. For example, there are cadastral map, housing hierarchical household map, the current situation of a new residential area, as well as the expected details of new development projects, drawing various charts and so on.

For example, if someone wants to buy a house in a certain place, but he doesn't know the specific location and price, he can go to the relevant department to check, use the computer of the relevant department to find the specific location and specific price, and check the desired house according to the data on the computer\[2\]. There is also want to go to a tourist resort, as long as you open the map on the computer, input the place you want to go, you can see how to go, the detailed location, and so on. Such examples are numerous, efficient and simple information supply procedures, as long as we input the desired data, we can quickly see the city data we want, and the calculation speed is very fast.

2. Application of RTK Technology
In order to meet the needs of Surveying and mapping in urban built-up area and planning area, urban survey shell has the characteristics of control surface, high precision and frequent use. GPS static measurement, there is no need for intervisibility and high precision between points, but it needs data processing after the event, so the positioning results can not be known in real time. If the accuracy does not meet the requirements, it must be returned. The application of RTK technology will not only meet the requirements of urban planning conditions, but also meet the geometric relationship of the building itself, so the precision of setting out is high. When RTK is used for building lofting, it is necessary to check the geometric relationship of the building itself. The network RTK is used Technology, staff do not need to carry out the layout of control points at all levels, only need to use the mobile station single person can quickly and accurately collect the data of a large range of detail points. At the same time, the electronic topographic map can be drawn in the field directly by using the drawing software, and the topographic map of various scales can be printed out by using the printing equipment, so that the measured terrain can be truly measured as what you see One step shorten the operation time, greatly improve the operation efficiency, and ensure the accuracy of the measurement results. For the short side, the relative relationship is difficult to meet. At the same time, attention should be paid to the convergence accuracy of the measurement point. If the convergence accuracy of the point is not high, the forced measurement may lead to large point position error\[3\]. Under the condition of high precision convergence, RTK technology can meet the requirements of planning and setting out with RTK land. In the boundary survey of construction land, RTK technology can real-time
measure the coordinates of boundary points, determine the boundary range of upper land 1, and calculate the land area. In the process of land classification and ownership survey, RTK technology can be used to measure real-time ownership boundary and land classification survey, which improves the speed and accuracy of measurement (Figure 2).

2.1. Urban traverse control survey
The traditional urban traverse control survey mostly adopts the method of laying traverse with total station, which requires at least three people to walk. The adjacent control points also require intervisibility. Each station has a long observation time, and it also needs office work for traverse adjustment calculation. Moreover, the longer the traverse is, the lower the accuracy of traverse points is. Due to various factors such as instruments, the error accumulation is also large. The accuracy of centimeter level can be achieved only in a few minutes with RTK. The setting out point of building planning should not only meet the requirements of urban planning conditions, but also meet the geometric relationship of the building itself. When RTK is used for building lofting, it is necessary to check the geometric relationship of the building itself. For the short side, the relative relationship is difficult to meet.

2.2. Suggestions on site selection of high speed railway stations
The newly-built high-speed rail station needs to be determined by urban survey combined with urban scale, urban structure and development. Large cities generally have multi center structure, and there are many stations in big cities. The success or failure of the development mainly depends on the accuracy of the urban survey and the planning degree to the city center. RTK technology can also be used in topographic survey, water area measurement, pipeline measurement, real estate measurement and other aspects. Using RTK mapping, we can directly determine the coordinates of topographical feature points without mapping root control and only based on a few datum points.

3. Application of CORS technology in urban survey

3.1. Fragment point measurement
In the field of urban surveying, the measurement of detail points is a very important link. Using CORS technology can break the traditional method of setting control points at all levels. The operators can quickly measure the coordinates of terrain points and ground objects by using the mobile station directly, and ensure the high accuracy of the measurement. At the same time, the mapping software in the electronic notebook is used to map the field at one time. In the specific operation process, there is
no need to set up a base station, and the point number and position are displayed on the notebook in real time. The simple graphic editing can be completed at the same time of field observation, which effectively reduces the workload of indoor editing.

3.2. Survey and delimitation of urban planning and construction land
For the measurement of construction land, it is necessary to accurately locate the boundary range of land use and the location of boundary posts, and accurately calculate the area of various types of land within the use limit. In the process of concrete measurement with CORS technology, the known coordinates may be used to determine the position of boundary posts, and the measurement accuracy can reach centimeter level\(^5\). At the same time, the area calculation function in the field work manual is used to directly calculate and check the boundary range of construction land, which not only simplifies the work procedure of construction land survey and delimitation, but also improves the work efficiency and ensures the accuracy of the measurement results (Figure 3).

![Figure 3. Operation mode of CORS system.](image)

3.3. Cadastral survey
In urban cadastral survey, the comparison scale and accuracy have higher requirements. Through the application of CORS technology to survey the ownership boundary points, clear the ownership and use boundary of each piece of land, and calculate the specific land use area. The CORS technology can accurately determine the ownership boundary point of each land, determine the land use boundary and calculate the land area in real time. CORS technology has the advantages of real-time, fast, no error accumulation and centimeter accuracy in cadastral survey. Once the satellite signal can not be received, the relevant measuring instruments are used to measure the covered ground by analytic method. The application of CORS technology in cadastral survey greatly promotes the development of Urban Digital China cadastral survey technology, and makes the urban cadastral management and cadastral survey methods realize automation.

3.4. Control survey
At present, in many cases, the traditional control survey method is used to carry out topographic survey in urban survey, some of which have higher requirements for interpoint visibility. Although GPS static, fast static and dynamic measurement does not need interpoint visibility, it can not achieve real-time positioning, and it needs post calculation to obtain accurate positioning data\(^6\). In the past, GPS static, fast static and dynamic measurement does not need interpoint visibility, but it can not effectively carry out real-time positioning. It is difficult to avoid finding unqualified measurement results in post-processing data, resulting in the need for rework and re measurement. However, CORS technology can improve the defect. Through the network RTK Technology for field operation, it can not only locate in real time, but also master the positioning results, ensure the accuracy of positioning results, and effectively improve the operation efficiency. The accuracy of real-time positioning can reach centimeter level.
4. Conclusion
With the continuous development of computer technology, it can automatically measure the engineering technology in the city, improve the actual effect of construction engineering measurement, and provide an important guarantee for the construction quality of the project. Therefore, the application of computer technology in urban survey can effectively improve the quality and efficiency of engineering survey.

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