

成都市某基坑变形监测方案设计分析

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摘要: 概述了基坑监测中需要注意的基本问题和一般性原则, 并结合成都市青羊区瑞南街东侧一基坑变形观测项目, 分析了该项目运行过程中涉及到的一些典型问题, 包括项目概况、基准点布设、观测周期等内容, 并结合实际情况得出相应结论。

关键词: 基坑; 基准点; 观测周期

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基坑监测主要包括基坑边坡的沉降监测, 水平位移监测以及对周边建筑、管线设施的监测, 变形中的任何量值超过允许范围, 将直接导致基坑边墙溃塌和周边建筑物失稳。因此, 基坑监测一直以来都是建筑物建设中首当其冲, 不可或缺的内容, 随着城市化进程的加快, 这项工作就愈加频繁和重要。

1 工程概况

“威尔顿”项目, 位于成都市青羊区瑞南街东侧, 工程规划建设净用地面积: 2902.16 m²; 规划总建筑面积: 10 064.60 m², 该工程地上7层, 地下1层, 其中地下1层为机动车车库及设备用房等。基坑深约4.3-5.7 m, 楼高7层。测区拟埋设水平位移观测基准点3个及沉降观测水准基点3个, 水平位移观测点10个, 周边建筑物沉降点16个, 主体建筑物沉降观测点10个。基准点按一定的时间间隔, 共观测3个周期, 并且经常性地检核使用。基坑按每挖1 m 观测一个周期, 共计6个周期, 基坑回填完前观测8个周期, 共约观测14个周期, 至基坑回填完为止(主体修至±0时)。

2 作业依据和已有测绘资料

本方案所依据的有关技术标准:

- 1) 中华人民共和国行业标准《建筑变形测量规范》JGJ8-2007;
- 2) 中华人民共和国国标《工程测量规范》GB 50026-93;
- 3) 中华人民共和国行标《建筑基坑支护技术规程》JGJ120;
- 4) 中华人民共和国国标《建筑地基基础设计规范》GB50007-2002;

5) 四川省地方标准《成都地区建筑地基基础设计规范》DB51/Y5026-2001;

6) 中华人民共和国国标《建筑地基基础工程质量验收规范》GB50202-2002;

7) 本工程技术设计方案。

3 观测方案设计

3.1 水平位移观测点及基准点的布设

1) 基准点的布设。在施工区附近(变形范围外)布设供水平位移观测使用的3个基准点, 预计观测2个周期。基准网布设根据场地情况, 可采用测角网、测边网、边角网或导线网; 各种布网均应考虑网形强度, 长度不宜悬殊过大。

2) 水平位移观测点的布设。水平位移观测点一般按照建筑物轴线方向间隔一定距离均匀布设, 测点的间距一般取8-15 m, 其位置常选在具有连接作用的混凝土圈梁、土钉墙、水泥搅拌桩、放坡开挖时的上部压顶上, 有水平支撑的情况下, 测点须布置在支撑的中间部位, 由于通视条件和客观因素存在, 如重物堆载处、低点处和重物频繁经过处, 也可以根据实地情况随机布设, 对于监测过程中发现的水平位移变化剧烈的区域, 测点需要适当加密。

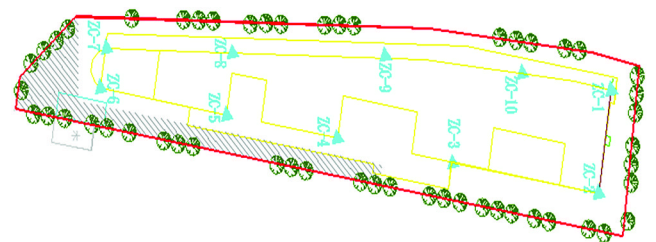


图1 基坑水平位移点位布设示意图

考虑到以上测点布置的基本原则, 同时该基坑附

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近有较近距离的建筑物，我们在基坑上口边线变形敏感部位，布设 10 个变形观测点，编号为 J1-J10，位置见图 1。

3.2 基准点和水平位移观测方法

1) 基准点观测方法。观测方法参照《建筑变形测量规范》二级精度要求进行，基准点水平角观测采用 J2 型全站仪按照 5 个测回测定，距离 4 测回测定。初始观测时如不稳定可适当增加观测的测回数，平差后点位坐标中误差应小于 5.0 mm，否则应进行返工重测，直至点位坐标中误差小于 5.0 mm。

2) 水平位移观测方法。基坑水平位移观测，主要采用前方交会法进行，即：在基准点上安置 J2 型全站仪，用 2 测回测定观测点的水平角度及水平距离，计算出观测点的坐标值，与其初始值进行比较计算出累计水平位移量。由于基坑开挖所引起的各种水平位移一般均向基坑内测，为直观方便起见，坐标系统采用平行于基坑边的独立坐标系统。

3.3 基坑水平位移观测精度及周期

水平位移观测的主要技术要求：

1) 水平位移观测精度要求。观测精度按二级变形测量要求进行，即观测点坐标中误差 5.0 mm。

2) 基坑水平位移观测周期。开挖观测，基坑开挖期间拟每天观测一次；基坑开挖到设计标高后，原则上每周监测一次，地下室筏板施工完基坑护壁施工期间每周一次，护壁完工至基础底板开始施工的间歇期每 2 周一次。

特殊情况基坑水平位移观测：如遇到变形较大、暴雨、积水、震动、荷载加压等情况可适当加密观测。观测到回填完为止，预计总观测约 14 个周期。

3) 基坑变形的监测报警值。有关预警值的确定规范无明确规定：支护结构坡体最大位移报警值：5.0 cm；以上各项发展速率报警值：每天发展不得大于 2.0 mm。

4 结 语

通过基坑监测的实践可以得出以下结论：

1) 靠实地监测提供动态信息反馈来指导施工全过程，并可通过监测数据来了解基坑的设计强度，为今后降低工程成本指标提供设计依据。

2) 可及时了解施工环境--地下土层、地下管线、地下设施、地面建筑在施工过程中所受的影响及影响程度。

3) 可及时发现和预报险情的发展及险情的发展程度，为及时采取安全补救措施充当耳目。

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6 结 语

工程设计、施工前一定要进行管线详查，工程管线详查与城市管线普查有着较大的区别，要想做好详查，必须在管线普查的流程、手段基础上加以改进。工程管线详查必须将工程范围内所有管线的“来龙去脉”交代清楚，管线的探测也要“精雕细琢”，越是不容易探测清楚的，越是工程的重点。总之，工程管线详查比管线普查更繁琐、更精细、风险更大、责任更重。做好工程管线详查，不是一朝一夕的事情。

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distributed points as a cluster, and then extract the target point clouds.
Key words Density-based clustering algorithms, the density distribution of point cloud, noise remove (Page:101)

Method of Basic Geographical Information Module Implementation Based on Google Earth by YIN Qiang

Abstract This paper introduced the mentality and the implementation method of kinds application subsystem general modul redevelopment based on Google Earth platform. It elaborated the implementation method of control and browse module and geographical information module, and implemented format conversion of the shp to kml file in the system.

Key words GE , basic geographical information modul , kml , format conversion (Page:105)

Establishment of the Geographical Name Inquiring System of Fuxin City Based on MO by REN Dongfeng

Abstract This paper talked about establishing the geographical name inquiring system of Fuxin city based on MapObjects controlling and VB language and in the foundation of the geographical name geodatabase of Fuxin city. The system achieved the function of brose, layers management, drawing, the geographical name inquiring, the buffer analysis, the shortest path analysis.

Key words geographical name inquiring system; system design;buffer analysis; path analysis (Page:107)

Formulas of Calculation of Road Horizontal Curve Coordinates in the Route Plane Control Survey Coordinate System by ZHEN Dengchun

Abstract A method of direct calculation of road horizontal curve coordinates in the route plane control survey coordinate system is introduced, and the related formulas, compact and practical, can be referenced for setting out of road horizontal curve, are derived.

Key words road;horizontal curve;coordinate calculation (Page:111)

Calculation and Application of Various Area in the Second Land Investigation by ZHANG Hui

Abstract This paper analyzed working method and mathematical models of line and sporadic feature, summary the advantages and disadvantages of various area proposed the improving and using direction, by Comparison between calculation formula of ellipsoid area and working method and precision assessment in the first land using status investigation.

Key words land investigation; area mature; precision assessment (Page:115)

Investigation about the Subdivision of the Digital Estate Figure of Wuhan by CHEN Zhen

Abstract The subdivision of the estate figure is apart of the plan of the real estate framing, and it's the basic figure of drawing and issuing the figure of the license of the estate. According to the provision of the property management at Wuhan, there are two ways of surveying and mapping the subdivision the figure. Framing is the basic unit of surveying and checking of the estate which is a very important code at surveying and management, and it is also the major index at the management of the records. The standardization of surveying and mapping the subdivision the estate figure is benefit for the department of the estate management, which can also support the service of the department. This thesis showed us some research about the surveying of boundary points, the coordination of the corner of the buildings, the serial number of the buildings and so on.

Key words the subdivision of the estate figure, express content, in-

vestigate of the technique (Page:118)

Role of Detection of Underground Pipeline in Municipal Engineering Design by XIAO Shun

Abstract Underground pipeline survey before carrying out municipal engineering is very important. This issue illustrated this significance by explaining the important role detailed municipal pipeline survey plays in municipal engineering, comparing between detailed municipal pipeline survey and underground pipeline survey and their pre- and follow-up services. Several illustrative cases were provided to enhance the conclusion.

Key words municipal engineering design, detailed municipal pipeline survey ,detection of underground pipeline (Page:121)

Design and Analysis of the Deformation Monitoring Program about a Foundation Ditch in Chengdu by LI Yong

Abstract This paper summarized the foundation excavation monitor need pay attention to in the basic problems and general principles and combining QingyangQu red east street in a Chengdu deformation observation projects analyzed the project operation processes involved with some typical problems including project profiles , benchmark layout ,observation period and so on contents and combined with actual situation corresponding conclusion.

Key words foundation ditch ,benchmark ,observation period (Page:125)

Optimum Design of CP Plane Control Network for High Speed Railway by XIAO Daiwen

Abstract By doing the simulation optimum design, the positional accuracy ,relative positional accuracy and reliability of CP networks was analysed, and the result showed the reliability of CP network was bader. The optimum scheme of CP network was presented. And frequency of repeatable measurement of this CP network may was reduced.

Key words CP plane control network ,positional accuracy ,reliability ,optimum design ,ballastless track (Page:127)

Thoughts of Surveying and Mapping Engineering Supervision by PENG Songlin

Abstract This paper starts with the analyzing the origin of relation and distinction of engineering supervision and project supervision, to discuss the need for the implementation of mapping and project supervision, and how could it be practiced. The focus is on how important the organization, legal system, market construction and other work are in promoting mapping and project supervision.

Key words supervision ; engineering supervision of surveying and mapping ,organization construction ,legal system construction ,market construction (Page:130)

Design and Practice of Deformation Monitoring of Building by FU Hai'ou

Abstract This paper expounded the design of the building's settlement monitoring process to Chengdu general tablet research building structural template Co., LTD as an example, the level of the stability analysis, combining results point on the watch for observation data statistics and analysis, and a detailed corresponding conclusion.

Key words subsidence monitoring ,baseline point , stability (Page:133)

Application of Regession Analysis Model in Dam Deformation Monitor by YANG Yongchao

Abstract This article focused on a regression analysis to monitor dam