

Design a Scale Model of Campus by Total Station

Divyank Budhbushan Hewalkar¹, Ganesh Suresh Gawade², Sakharam Suresh Jadhav³, Amar Sitaram Parab⁴, Harshal Suresh Akerkar⁵, Aditya Arvind Salgaonkar⁶, Prof.Keshav Ramdas Manerikar⁷, Prof. Nandita Yogesh Yadav⁸

^{1, 2, 3, 4, 5, 6} Students, Civil Engineering Department, Yashwantrao Bhonsale Polytechnic Sawantwadi

^{7, 8} Lecturer, Civil Engineering Department, Yashwantrao Bhonsale Polytechnic Sawantwadi

Abstract - Our project mainly based on “Making a detailed accurate scale model of our BKC college campus by using Total Station Survey”. In that we perform a survey in our college campus with the help of Total Station, for taking all the measurements accurately. The objective of this project is determine and evaluates topography at the ground using Total Station. According to the result obtained survey works as map containing the elevations and co-ordinates, 3D map that can be used in future projects within that area. Also Assistance to graduate students to have good experience to work with survey instrument the project of designing a scale model of a college using a total station involves surveying the college campus using a total station, collecting accurate measurements of the buildings, walkways, and other features of the campus, and of the college using CAD software. The scale of the model will depend on the size of the college and the available space for the model. The project requires knowledge of surveying, CAD software, and model-making techniques, and may involve collaboration with professional surveyors and engineers. The resulting scale model can be used for a variety of purposes, such as campus planning, marketing, and educational exhibits.

Key Words: Total Station Survey, Measurements, Planning.

surveying, either or both of the above formats may be used for planning, design and construction of works, both on the surface and underground. At a later stage, surveying techniques are used for dimensional control or setting out of designed constructional elements and also for monitoring deformation movements. In the first instance, survey in requires management and decision making in deciding the appropriate methods and instrumentation required to complete the tasks satisfactorily to the specified accuracy..

2. Body of Project

2.1 Objective

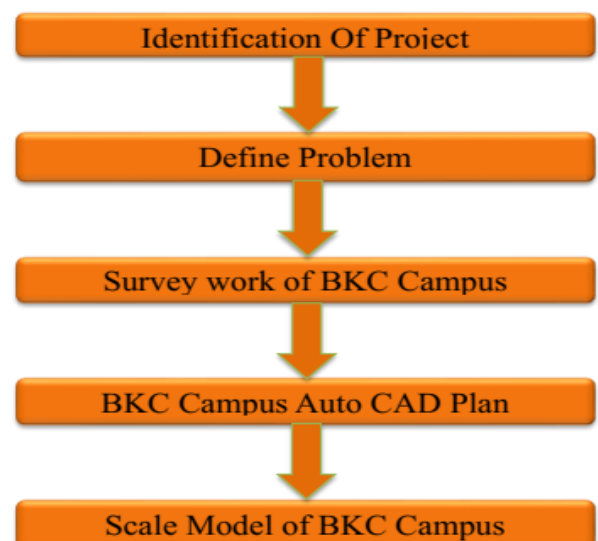
General objective of this research is intended to evaluate topography of the college building inside the Yashwantaro Bhonsale College of engineering using Total Station Specifically.

1. Survey of boundary line of BKC Campus by total station.
2. To draw map from collected data by the total station.
3. To calculate the plot area of BKC campus.
4. To design BKC Campus drawing on AutoCAD.
5. To make an accurate scale model of BKC Campus.

2.2 Methodology of Project

1. INTRODUCTION

Bhonsale Knowledge City was established in year 2014 with first institute of Technology. The BKC Campus is very large institution and today it is functioning at a high level. We have the undertaken a project to make a scale model of this reputed BKC Campus. Our intension is to present the BKC Campus through an accurate scale model. As a result, considering all the above we discussed with our mentor to fit all these things accurately in the model. Total station was selected from the survey instrument to resolve this discussion. We decided to conduct the survey, through total station keeping in mind the advantages of speeding up the field work, getting more accuracy, of measurement eliminating the manual error, involved in reading and recording making calculation of indicators very fast etc. Our approach as to taken on accurate scale model of the BKC Campus by surveying through a total station. Today, the role of surveying got much attention to be used in many applications with better accuracy. The term accuracy is common in many applications to express the quality of observations, measurements or/and calculations. Surveying may be defined as the science of determining the position, in three dimensions, of natural and man-made features on or beneath the surface of the Earth. In engineering



2.3 Overview of Total Station

- In this project, ES series Topcon (ES-105) total station was used. The total station is a surveying instrument that combines the angle measuring capabilities of theodolite with an electronic distance measurement (EDM) to determine horizontal angle, vertical angle and slope distance to the particular point.
- Coordinates of an unknown point relative to a known coordinate can be determined using the total station as long as a direct line of sight can be established between the two points. Angles and distances are measured from the total station to points under survey, and the coordinates (X, Y, and Z or northing, easting and elevation) of surveyed points relative to the total station position are calculated using trigonometry and triangulation.
- Total station measurements are affected by changes in temperature, pressure and relative humidity, but it can be corrected for atmospheric effects by inputting changes in temperature, pressure and relative humidity. Shock and stress result in deviations of the correct measurement as a result decreases the measurement accuracy. Beam interruptions, severe heat shimmer and moving objects within the beam path can also result in deviations of the specified accuracy by the manufacture. It is therefore important to check and adjust the instrument before measurement.



Figure (1) Total station (ES-105)

2.4 Parts of The Instrument ES Function

- | | |
|---|--------------------------------|
| 1. Handle | 16. Objective lens |
| 2. Bluetooth antenna | 17. Handle locking screw |
| 3. External interface hatch (USB port) slot | 18. Tubular compass |
| 4. Instrument height mark | 19. Vertical clamp |
| 5. Battery covers | 20. Vertical fine motion screw |
| 6. Operation panel | 21. Speaker |

- | | |
|------------------------------------|----------------------------------|
| 7. Serial connector | 22. Trigger key |
| 8. Circular level | 23. Horizontal fine motion screw |
| 9. Circular level adjusting screws | 24. Horizontal clamp |
| 10. Base plate | 25. Tribrach clamp |
| 11. Leveling foot screw | 26. Telescope eyepiece screw |
| 12. Optical plummet focusing ring | 27. Telescope focusing ring |
| 13. Optical plummet eyepiece | 28. Sighting collimator |
| 14. Optical plummet reticle cover | 29. Instrument center mark |
| 15. Display unit | |



Figure (2) Component Parts

2.5 Experimental Work

Reconnaissance Survey

- We showed all new building constructed in BKC campus in the new diagram.

In this survey we identify the following data:

1. There are nine numbers of buildings.
2. Water Sources
3. Parking Area
4. Campus Security
5. New Building- Mess, Medical and Nursing

After completing Reconnaissance survey we draw the rough plan of BKC campus



Figure (3) Campus Drawing

2.6 Result and Application

Layout map of BKC Campus

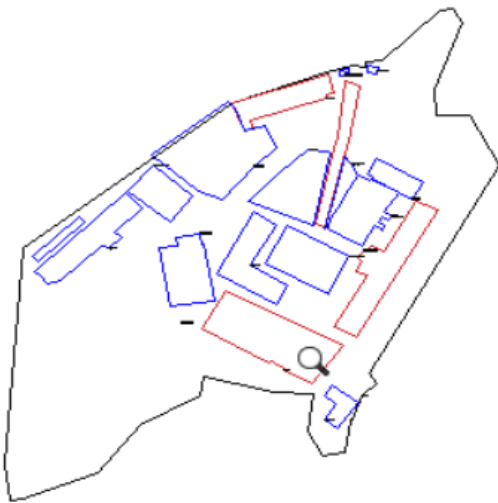


Figure (3) Line Layout

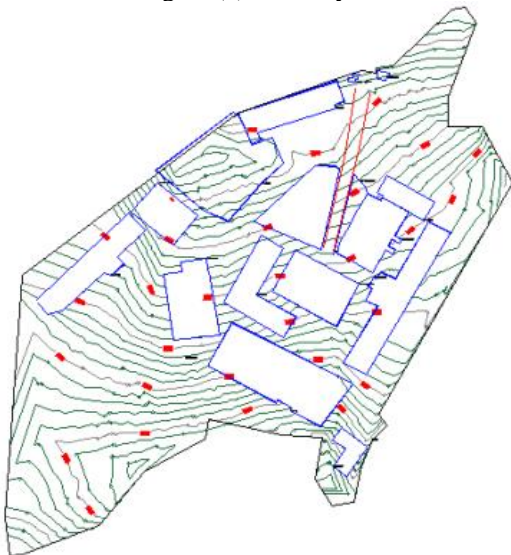


Figure (3) Contour Layout

- Overall, the success of the project depends on effective planning, collaboration, and communication among the project team members.
- The project can be a challenging but rewarding experience that can help enhance skills and knowledge in surveying, modeling, and design. Teamwork and collaboration: The conclusion of the project can also highlight the teamwork and collaboration among the project team members, including the surveyors, designers, model makers, and other stakeholders.
- The project team can evaluate the communication and coordination among the team members, assess the effectiveness of the project management, and identify any areas for improvement. Finally, the conclusion of the project can summarize the outcomes achieved and the impact of the scale model on the stakeholders.
- The project team can showcase the physical scale model to various audiences, including college administrators, faculty, students, and other interested parties.
- The team can evaluate the feedback received, assess the effectiveness of the scale model in achieving its objectives, and recommend any future improvements or follow-up actions.

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3. CONCLUSIONS

- In conclusion, designing a scale model of a college using a total station can be a complex and rewarding project.
- The scope of the project can include site surveying, 3D modeling, scale modeling, detailing and finishing, and presentation.
- The use of a total station can ensure that the survey data is accurate and detailed, which can help in creating a realistic and accurate model.
- Creating a physical model of the college of BKC campus can provide a visual representation of the college's design, layout, and features.
- This can be useful for various stakeholders such as college administrators, faculty, students, and others who are interested in the college.
- The model can also help in identifying potential design issues or opportunities for improvement.