



POORNIMA

COLLEGE OF ENGINEERING

Promoted by Shanti Education Society, Affiliated to Rajasthan Technical University & Approved by AICTE

Report On Total Station

NAME OF ACTIVITY: Workshop on Total Station

DATE & DURATION: 22 November 2023

ORGANIZED BY: Department of Civil Engineering

OBJECTIVE: The objective might include:

Operational Understanding:

- Learn how to set up and calibrate a Total Station for accurate measurements.
- Gain proficiency in operating the instrument for distance, angle, and coordinate measurements.

Data Collection and Management:

- Explore techniques for efficient data collection using Total Station.
- Understand the process of managing and storing collected data.

Field Surveying Techniques:

- Apply Total Station technology in real-world field survey scenarios.
- Practice different surveying techniques such as traversing, leveling, and stakeout.

Accuracy and Error Analysis:

- Learn methods for assessing and minimizing errors in Total Station measurements.
- Understand the factors that contribute to measurement accuracy and precision.

Software Utilization:

- Familiarize participants with software used for data processing and analysis in conjunction with Total Station measurements.
- Provide hands-on experience with Total Station software for generating maps and reports.


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Integration with Other Technologies:

- Explore how Total Station technology integrates with other surveying and mapping technologies (e.g., GPS, GIS).

Best Practices and Safety:

- Emphasize safety protocols during Total Station operation.
- Discuss best practices for efficient and accurate surveying using Total Station equipment.

Hands-On Practical Exercises:

- Engage participants in practical exercises to reinforce theoretical concepts.
- Provide real-world scenarios for participants to apply their Total Station skills.

COURSE OUTCOMES:

- Gain proficiency in operating the Total Station for conducting accurate field surveys and measurements.
- Understand the principles and methodologies of Total Station to perform topographic mapping and layout marking.
- Demonstrate teamwork and communication skills in conducting collaborative field surveys using Total Station.

MAPPING OF CO WITH PO AND PSO

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	3	-	-	-	-	-	-	-	-	3	-
CO2	-	-	-	3	-	-	-	-	-	-	-	-	-	-	3
CO3	-	-	-	-	-	-	-	-	3	-	-	-	2	-	-

INTRODUCTION

Department of Civil Engineering conducted a one-day workshop for 2nd year students of Civil Engineering on 22 November 2023. This workshop was aimed to groom civil engineering students with essential knowledge and exposure to the real work with Total Station and to encourage leadership and teamwork skills.

The one-day workshop was divided into two sessions. In first session (morning) theory part was covered. 2 Hours lecture delivered by Mr. Prateek Sharma (Assistant Professor) on Total Station, E.D.M, parts of Total Station & Uses of Total Station. In Second session (afternoon) demonstration and Field work covered with help of Mr. Satendra Sharma (Technician).

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Total No of Participants: 28



BROCHURE:



About The Workshop

The Total Station is a surveying instrument that combines electromagnetic distance measuring and electronic theodolite. This workshop aims to provide civil engineering students with hands-on experience, knowledge, and leadership skills to work with Total Station, understand its uses, and take readings. The workshop will offer experiential learning opportunities to gain firsthand knowledge about surveying fieldwork.

To be organized by:
Department of Civil Engineering

 **Wednesday, November 22, 2023**
 **Time: 9:30 AM to 11:30 AM**

**Venue: Room no. 1004 & Volleyball
Ground
Poornima College of Engineering
Jaipur**

RSVP

Mr. Prateek Sharma
Assistant Professor
+91-9950267733




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CIRCULAR:



Prateek Sharma 2 days ago
to PCE, Satendra, me, H... ✓



Dear Students,

Department of Civil Engineering plans a one-day workshop (2 Hrs) for 2nd year students of Civil Engineering on 22 November 2023.

Timing – 9.30 -11.30 A.M.

Faculty Coordinator – Prateek Sharma (9950267733)

Venue: Room No.1004 & Volleyball Ground, Poornima College of Engineering, Jaipur

PFA

POORNIMA
COLLEGE OF ENGINEERING

Affiliated to RTU, Kota - Approved by AICTE & UGC under 2(f) - Accredited by NBA

Workshops on “Total Station”

About The Workshop
The Total Station is a surveying instrument that combines electromagnetic distance measuring and electronic theodolite. This workshop aims to provide civil engineering students with hands-on experience, knowledge, and leadership skills to work with Total Station, understand its uses, and take readings. The workshop will offer experiential learning opportunities to gain firsthand knowledge about surveying fieldwork.

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RSVP
Mr. Prateek Sharma
Assistant Professor
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Workshop Details

ABOUT INSTRUMENT

A total station (TS) or total station theodolite (TST) is an electronic/optical instrument used for surveying, levelling for construction work. Robotic or motorized

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operator to control the instrument from a distance via remote control. It is an electronic transit theodolite integrated with electronic distance measurement (EDM) to measure both vertical and horizontal angles and the slope distance from the instrument to a particular point, and an on-board computer to collect data and perform triangulation calculations. This eliminates the need for an assistant staff member as the operator holds the retro reflector and controls the total station from the observed point. These motorized total stations can also be used in automated setups known as Automated Motorized Total Station (AMTS).



WORKING PROCESS

This is the best instrument to carry out survey. The total station was switched on and then the required data pertaining to the groups allotted were entered. Then using the system of laser reflection, we assumed various points to take the fore sight reading. The instrument was then processed to measure the reading of the specific point. Thus, the data was saved and the results were taken out on a sheet with the help of a computer.

APPLICATIONS OF TOTAL STATION

Total stations are mainly used by land surveyors and civil engineers, either to record features as in topographic surveying or to set out features (such as roads, houses or boundaries). They are also used by archaeologists to record excavations and by police, crime scene investigators, and private accident reconstruction and insurance companies to take measurements of scenes.

Mining Purpose

Total stations are the primary survey instrument used in mining surveying. A total station is used to record the absolute location of the tunnel walls, ceilings (backs), and floors as the drifts of an underground mine are driven. The recorded data are then downloaded into a CAD program, and compared to the designed layout of the tunnel. The survey party installs control stations at regular intervals. These are small steel plugs installed in pairs in holes drilled into walls or the back. For wall stations, two plugs are installed in opposite walls, forming a line perpendicular to the drift. For back stations, two plugs are installed in the back, forming a line parallel to the drift. A set of plugs can be used to locate the total station set up in a drift or tunnel by processing measurements to the plugs by intersection and resection.

Mechanical and electrical construction

Total stations have become the highest standard for most forms of construction layout. They are most often used in the X and Y axis to lay out the locations of penetrations out of the underground utilities into the foundation, between floors of a structure, as well as roofing penetrations. Because more commercial and industrial construction jobs have become controlled on building information modelling (BIM), the coordinates for almost every pipe, conduit, duct


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and hanger support are available with digital precision. The application of communicating a virtual model to a tangible construction potentially eliminates labour costs related to moving poorly measured systems, as well as time spent laying out these systems in the midst of a full-blown construction job in progress.

Meteorology

Meteorologists also use total stations to track weather balloons for determining upper-level winds. With the average ascent rate of the weather balloon known or assumed, the change in azimuth and elevation readings provided by the total station as it tracks the weather balloon over time are used to compute the wind speed and direction at different altitudes. Additionally, the total station is used to track ceiling balloons to determine the height of cloud layers. Such upper-level wind data is often used for aviation weather forecasting and rocket launches.


FUNCTION

Angle measurement

Most total station instruments measure angles by means of electro-optical scanning of extremely precise digital bar-codes etched on rotating glass cylinders or discs within the instrument. The best quality total stations are capable of measuring angles to 0.5 arc-second. Inexpensive "construction grade" total stations can generally measure angles to 5 or 10 arc-seconds.

Distance measurement

Measurement of distance is accomplished with a modulated infrared carrier signal, generated by a small solid-state emitter within the instrument's optical path, and reflected by a prism reflector or the object under survey. The modulation pattern in the returning signal is read and interpreted by the computer in the total station. The distance is determined by emitting and receiving multiple frequencies, and determining the integer number of wavelengths to the target for each frequency. Most total stations use purpose-built glass prism (surveying) reflectors for the EDM signal. A typical total station can measure distances up to 1,500 meters (4,900 ft) with an accuracy of about 1.5 millimetres (0.059 in) \pm 2 parts per million. Reflecting total stations can measure distances to any object that is reasonably light in colour, up to 1,000 meters.


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Coordinate measurement

The 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 easting, northing, and elevation) of surveyed points relative to the total station position are calculated using trigonometry and triangulation.

To determine an absolute location, a total station requires line of sight observations and can be set up over a known point or with line of sight to 2 or more points with known location, called free stationing.

For this reason, some total stations also have a Global Navigation Satellite System receiver and do not require a direct line of sight to determine coordinates. However, GNSS measurements may require longer occupation periods and offer relatively poor accuracy in the vertical axis.

Data processing

Some models include internal electronic data storage to record distance, horizontal angle, and vertical angle measured, while other models are equipped to write these measurements to an external data collector, such as a hand-held computer.

When data is downloaded from a total station onto a computer, application software can be used to compute results and generate a map of the surveyed area. The newest generation of total stations can also show the map on the touch-screen of the instrument immediately after measuring the points.

Conclusion:

The main focus of the workshop will provide field knowledge about Total Station, its use on field. It's working process on field. Also, too familiar with E.D.M Based instrument.



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Attendance:

Poornima College of Engineering, Jaipur			
Department of Civil Engineering			
Workshop on "Total Station"			
Attendance (22/11/2023)			
S.No.	Reg. No	Student Name	Signature
1	PCE22CE508	AHTISHAM RASHID	Ahtisham
2	PCE22CE001	AJAY YADAV	Ajay Yadav
3	PCE22CE002	ANSH KUMAR DVIVEDI	Ansh
4	PCE22CE506	ARJUN KUMAR	ABSENT
5	PCE22CE003	ARYAN BAIRWA	Aryan
6	PCE22CE004	ARYAN YADAV	Aryan
7	PCE22CE005	HIMANSHU MEENA	Himanshu
8	PCE22CE006	LOKESH KUMAWAT	Lokesh
9	PCE22CE007	MANISH KARWASARA	Manish
10	PCE22CE008	MAYANK MEENA	Mayank
11	PCE22CE009	MOHAMMAD MONISH RAZA	ABSENT
12	PCE22CE010	MOHAMMED ADIL	Adil
13	PCE22CE011	MS ASTHA GARG	ABSENT
14	PCE22CE013	MS JAHNAVI NINAMA	Jahnavi Ninama
15	PCE22CE012	MS PARUL SHARMA	Parul Sharma
16	PCE22CE031	NITIN SHARMA	Nitin Sharma
17	PCE22CE015	PAVAN GURJAR	Pavan Gurjar
18	PCE22CE017	PRAGYA SHEKHAWAT	Pragya
19	PCE22CE018	RAJESH JANGIR	ABSENT
20	PCE22CE019	ROHIT PRAJAPATI	Rohit
21	PCE22CE020	SAMEER BAIRWA	Sameer
22	PCE22CE021	SAMEER CHOUDHARY	Sameer
23	PCE22CE022	SIDDHARTH SAINI	Siddharth
24	PCE22CE023	SUNIL KUMAR RANWA	Sunil
25	PCE22CE024	TANMAY KUMAR	ABSENT
26	PCE22CE025	TUSHAR JAISWAL	Tushar
27	PCE22CE026	VISHAL DHAWAN	Vishal
28	PCE22CE027	YASHRAJ ADITYA	ABSENT
29	PCE22CE028	YUVRAJ SINGH GURJAR	Yuvraj
30	PCE23CE800	ADITYA SAINI	Aditya
31	PCE23CE801	AJAY SINGH CHOUHAN	Ajay Singh
32	PCE23CE802	AMAN VISHAL	Aman Vishal
33	PCE23CE803	RAVI RAUSHAN	Ravi Raushan
34	PCE23CE804	VIVEK KUMAR	Vivek Kumar


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FEW GLIMPSES OF THE EVENT:



FEEDBACK:

FEEDBACK ANALYSIS (2023-24)							
S.No.	Attributes	Total Feed Back					100
1	Did the session meet its objectives?	Outstanding	Excellent	Good	Average	Satisfactory	Remark
		70.21	11.91	9.99	1.00	0.00	
2	Did you find the contents useful?	Outstanding	Excellent	Good	Average	Satisfactory	Remark
		71.25	19.19	7.92	1.11	0.00	
3	Did it help students to enhance their skills or learnings?	Outstanding	Excellent	Good	Average	Satisfactory	Remark
		73.29	16.11	6.49	1.20	0.00	
4	Did you receive uninterrupted Connectivity in case of online sessions?	Outstanding	Excellent	Good	Average	Satisfactory	Remark
		71.20	19.59	5.19	1.32	0.00	
5	How do you rate this session overall?	Outstanding	Excellent	Good	Average	Satisfactory	Remark
		72.29	18.52	6.99	1.00	0.00	
Overall Remark:- These kind of sessions should be conducted in the future too for more awareness.							


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