

A  
Report on  
Field Project

“DESIGN OF SEWERAGE SYSTEM FOR JAGADAMBHA  
COLLEGE OF ENGINEERING AND TECHNOLOGY  
YAVATMAL”



**JAGADAMBHA**  
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# “DESIGN OF SEWERAGE SYSTEM FOR JAGADAMBHA COLLEGE OF ENGINEERING AND TECHNOLOGY YAVATMAL”

By

Civil Engineering Department

1. Title of Activity	DESIGN OF SEWERAGE SYSTEM FOR JAGADAMBHA COLLEGE OF ENGINEERING AND TECHNOLOGY YAVATMAL.
2. Duration of Activity	30Hrs.(Session 2019-20)
3. Objective	To study detailed concept of Sewerage system and design project
4. No. of Beneficiary	104 Students work on this project
5.Guided By	Prof. Pranay P. Deogade/ Prof. A.H. Meshram

## INTRODUCTION

- I. Sewerage system, network of pipes, pumps, and force mains for the collection of waste water, or sewage, from a community. Modern sewerage systems fall under two categories: domestic and industrial sewers and storm sewers. Sometimes a combined system provides only one network of pipes, mains, and outfall sewers for all types of sewage and runoff. The preferred system, however, provides one network of sewers for domestic and industrial waste, which is generally treated before discharge, and a separate network for storm runoff, which may be diverted to temporary detention basins or piped directly to a point of disposal in a stream or river.
- II. Sewerage system has evolved throughout history with changes in socio economic conditions city structures and the environment. Effective sewage management and its design is essential for nutrient recalling and for maintaining ecosystem integrity.
- III. Project deals with the existing sewerage system at campus of Jagadambha College of engineering and technology, Yavatmal. Campus survey was conducted to terrain slope and location of building with the advanced total station instrument and too for profile levelling, bearing, calculation of reduced levels for the design of sewerage system.



  
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## SURVEYING:

Surveying is a branch of civil engineering and it is used to represent the general features of land in their proper relative positions. From these measurements, the drawings are prepared which may be in the form of a plan or a map.

The main objective of surveying is to prepare a map or a plan of the area surveyed. The map or plan is the horizontal projection of area on a horizontal plan. On plan, horizontal distances only are shown vertical distances between the points can be shown by contourlines.


## TOTAL STATION:

1. A total station consists of a teodolite with a built-in distance meter (distaner), and so it can measure angles and distances at the same time.
2. Today's electronic total stations all have an auto-electronic distance meter (EDM) and electronic angle scanning. The coded scales of the horizontal and vertical circles are scanned electronically, and then the angles and distances are displayed digitally.
3. The horizontal distance, the height difference and the coordinates are calculated automatically and all measurements and additional information can be recorded.
4. Leica total stations are supplied with a software package that enables most survey tasks to be carried out easily, quickly and elegantly.
5. The most important of these programs are presented in the section "Applications programs". Total stations are used wherever the positions and heights of points, or merely their positions, need to be determined.



Total Station



  
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## MEASURING SLOPES:

1. If slopes are to be determined in % or to be staked out, e.g. for gutters, pipelines or foundations, two different methods are available.
2. With a level Measure the height difference and the distance (either optically with the stadia hairs or with the tape). The slope is calculated as follows:

$$100 \Delta H / D = \text{slope in \%}$$

3. With a theodolite or total station Place the instrument on a point along the straight line the slope of which is to be determined, and position as target a second point along that line. Using the telescope,
4. Determine the instrument height I at the staff. The vertical-circle reading giving the zenith angle in gon or degrees can be reset to % (refer to user manual) so that the slope can be read off directly in
5. %. The distance is irrelevant. A reflector pole fitted with a prism can be used instead of the staff. Extend the reflector pole to the instrument height I and use the telescope to target the center of the prism



  
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## LANDSCAPE DRAINAGE SYSTEM

Landscaping that sits in low-lying area of your property will most likely cause water to collect our pool as water flows downhill to the lowest point.

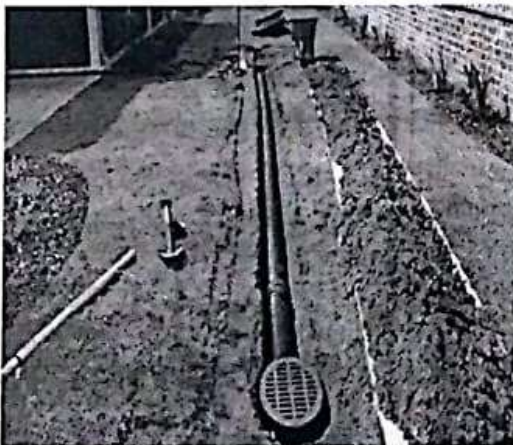
Even the slightest of slope of causes water to flow and erode the ground. Professional landscape drainage assistant may be necessary if your property become soggy or muddy with excess surface water.

### Surface drainage systems:

This is a standard drainage system used for irrigation or in area of excess rainfall. This system work only do the application of gravity and come in either bedded inmate or graded system.

### Subsurface drainage systems:

This is also standard type of drainage system that, although below ground, has similarities to surface drainage system. It also work due to gravity, but operates is regular and controlled manner.



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## DESIGN OF DRAINAGESYSTEM

### 1 Sewers

Sewer pipes are available in a variety of materials. They can be made of cast and ductile iron, PVC, concrete, asbestos cement, HDPE (high density polyethylene), brick, and vitrified clay. Most new sewer pipe has a circular cross section, however, many older sewers, especially those made from brick, have cross sectional shapes.



  
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## 2 Vertical Alignments

The vertical position of a sewer is defined by its invert level (IL). The invert of a pipe refers to the lowest

point on the inside of the pipe. The invert level is the vertical distance of the invert above some fixed level or datum. Soffit level is the highest point on the inside of the pipe and the crown level is the highest point on the outside of the pipe.

## 3 Manholes

Manholes are structures designed to provide access to a sewer. Access is required for testing, visual inspection of sewers, and placement and maintenance of flow of water quality monitoring instruments. Manholes are usually provided at head so run at locations where there is changes in direction, changes in gradient changes in size, at major junctions with other sewer and at every 90 to 200 m intervals depending on the size of the sewer pipes. The diameter of the manhole will depend on the size and the orientation and number of inlets.

## 4 Gully Inlets

Gully inlets are inlets where surface water from roads and paved areas are entering the sewer system. Gullies consist of a grating and usually an underlying sump to collect heavy material in the flow. A water seal is incorporated to act as an odor trap for those gullies connected to combined sewers. Gullies are connected to the sewer by lateral pipes.

## 5. Ventilation

It is important to have adequate air ventilation in all urban drainage systems, but particularly in foul and combined sewers. It is needed to ensure that aerobic conditions are maintained within the pipe, and to avoid the possibility of build-up of toxic or explosive gases.



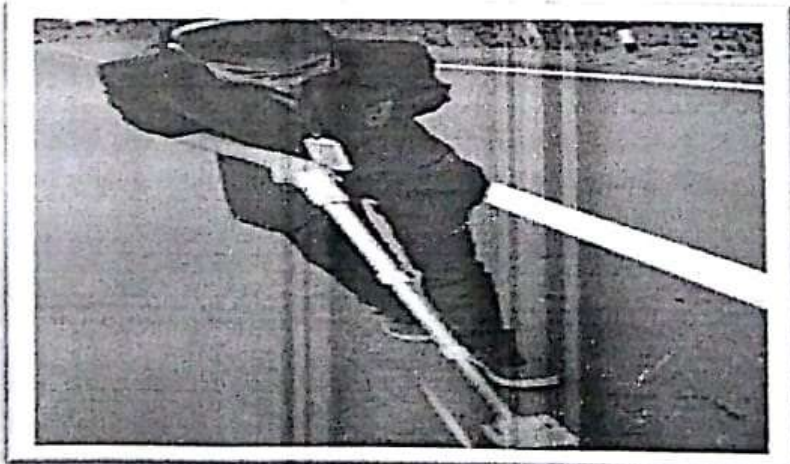
  
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PHOTOGRAPHS



  
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Workshop Certificate:



HAAC ACCREDITED COLLEGE  
**JAGADAMBHA**  
COLLEGE OF ENGINEERING & TECHNOLOGY, YAVATMAL

In nexus with  
**Vijay Engineering Services, Akola**

Sr. No. 77

## CERTIFICATE

This is to certify that Prof./Mr./Miss. Somnath Dhamankar

Faculty/Student of Civil Engineering Department has  
participated and successfully Completed  
**Three Days Onsite Training & Workshop on  
"Total Station"**

From : 06<sup>th</sup> Feb 2020 To 08<sup>th</sup> Feb 2020



Vijay Palsukar  
Mr. Vijay Palsukar  
Director VES, Akola

S.S. Kendhe  
Prof. S. S. Kendhe  
HOD Civil Engineering

H.M. Baradkar  
Dr. H. M. Baradkar  
Principal

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To  
The Principal  
JE Yavatmal

14 January 2020

Subject: Permission to Technical Course in Collaboration with Minor Project at College Campus.

Respected sir,

We are requesting permission to use the college premises as the site for a Minor Project as well as for total station training site. We have already told our students to start preparing their p<sup>ve</sup>-project work and they are really excited. The event will be held for three days from next week so I wanted to know in advance if I could use college campus for those three days.

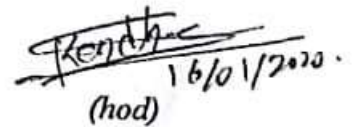
As a part of SGBAU curriculum, B.E., III year student must prepare a mini project during their third year. It will be great privilege to our students to receive training and guidance for 'minor project work'. Also we try to provide them a technical training of "How to use Total Station for Morden Surveying", which will help them to enhance their technical skill.

Yours faithfully

  
14/01/2020



Prof. R. J. Raut

(Technical Course Co-ordinator)

  
16/01/2020

(hod)

Prof. Shashank S. Kendhe  
HOD, Civil Engineering  
Jagadamba College of Engineering &  
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- 1) Prof. A. H. Meshram  - 3<sup>rd</sup> yr. CL1  
2) Prof. P. P. Deogade  - 3<sup>rd</sup> yr. CL-2  
(Minor Project In-charge)



  
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17/01/2020