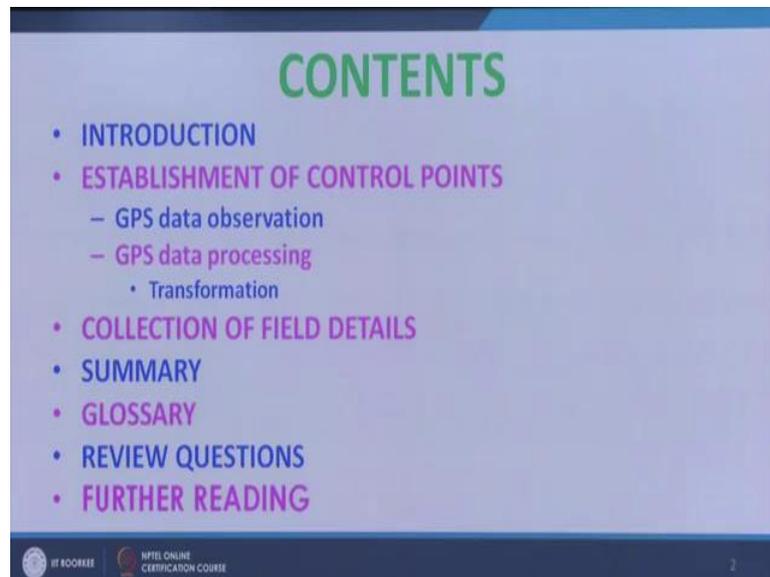


**Digital Land Surveying**  
**Dr. Jayanta Kumar Ghosh**  
**Department of Civil Engineering**  
**Indian Institute of Technology, Roorkee**

**Lecture – 03**  
**Overview**

Welcome students, today I am taking your third class on Digital Land Surveying and Mapping. In this class I will discuss on Overview of Digital Land Surveying.

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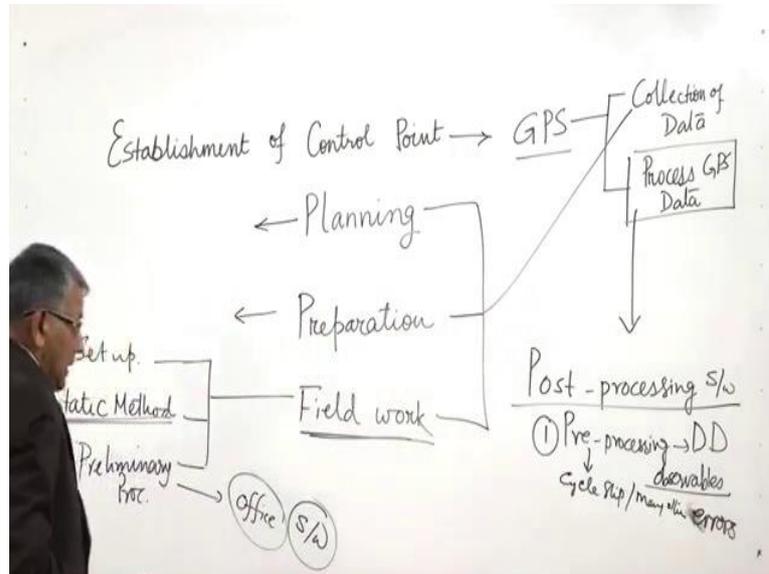


Now, the digital land surveying will be discussed under the following acts. First I will let you know what really taking up in digital land surveying really what digital land surveying is and then, how do carryout digital land surveying overall. Now the above all land surveying has to be done first we have to establish the control point, then we have to go for collection of field data.

Now, already I had discussed you the objective of surveying is to carry out field operation to collect field data and subsequently to prepare map of the area. Now in digital land surveying, we will make use of some instrument to collect the data in digital format and then we will like to make use of that digital data to prepare a map using software. So, the digital land surveying and mapping will consist of a digital data

collection and digital mapping. Now in this class I will like to discuss their overview of only the digital land surveying part.

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Now, digital land surveying actually consist of 2 fundamental part; one is the first part is to establishment of control point and the once the control point gets established we make use of these control points for collection of collection of geo spatial data or other data defining the surface of the earth. Now in digital land surveying we will establish the control point by making use of GPS; global positioning system and the collection of geo spatial data will be done making use of instrument called total station.

To use the global positioning system for establishment of control point again it has 2 part one is that collection of GPS data and the next part is to process GPS data, again this GPS data collection consists of now collection of GPS data again it has 3 parts; first we have to go for planning then we should go for preparation and after planning and preparation we will actually go for field work. So, now planning is very important for GPS (Refer Time: 04:47) because we must ensure that the data is taken at the stations really which we have chosen or we want to have as the control point and during that we must have the ensure that the satellites are available and the location of the stations should be suitable for GPS observation. So, all these thing we should ensure during planning a stage.

Now, once we planned where we will take the observation or data we should go for preparation for taking the data now during preparation during preparation we need to prepare our self with the instruments to be used the human resources that is to be engaged whether they are properly trained and then we should see whether we can; we do have the proper arrangement for other activities like staying communication then data storage and many other things. So, we should prepare our self for (Refer Time: 06:28) field work.

Now once we have plan properly and accordingly we have prepared for taking the field data we should go to field for our field work now again field work is also consisting of few steps first we have to ensure that we are reached to the station location where we want to get our data and we should set up our instrument properly and we should ensure that the instrument is being set up in such a location which is stable in nature then the visibility of or the availability of GPS signals are proper. So, once the instrument the various parts of the instruments are properly connected the power and the energy available is whether it has enough space to store the data and all those thing we have to ensure first then we should take actual observation.

Now, to take the actual observation we should first apply the appropriate method now in case of control point establishment it is the static method, we apply the static method and we should ensure about the height of the instrument about the epoch of the observation about the duration of observation about the availability of proper geometry of satellites. So, with all those intricacies we should take our observation for adequate duration. So, duration of observation is very important for control point establishment we should always take more duration how are the duration better will be the quality of the data.

So, once the then we have to take the data for duration whichever we are decided to take once the data is taken during the observation also we need to go for some preliminary processing on field itself to know or to test whether the data we are observing we are taking is of proper quality or not. And also we should see whether the amount of data is sufficient or not and if possible before we leave the station, we should do some preliminary processing; preliminary processing to find out whether the data observe is of sufficient good quality sufficient quantity and will be of our use or not.

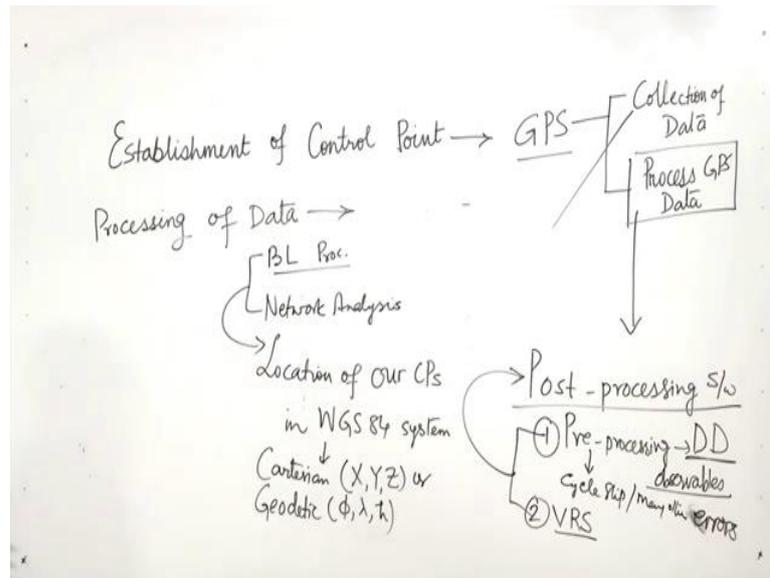
So, when we ensure that yes otherwise if we can ensure that the data we have observed is of appropriate quality or appropriate amount or the amount which is same is ok then we can transfer the data from field work to the office and the observation sometimes field work observation for control point establishment maybe consisting of number of sessions number of days. So, if we plan to take the observation for number of days or number of sessions we have to adapt accordingly.

Once we are found the data is of our expected nature then we should go for transfer of data to office software and we should go for processing of GPS data. The next step of GPS work. So, to process the data first we have to make available some post processing software must be available in the office computer for processing our GPS data and our first thing we need to do is to import the data from GPS receiver to the computer memory and then to the preprocessing software and we should go for preprocessing is done to improve the quality of the GPS observation and also for control point establishment we should go for the double differencing observables.

So, generally we should go for control point establishment is done by making use of double difference observable which is derived from observable observe GPS observations and also during preprocessing we are identify and detect and (Refer Time: 13:11) cycle slip and many other errors. So, any way after these double differencing availability we should next look for some virtual reference station now what is virtual reference station these are the stations which are available in the internet where the generally these are IGS stations where the observation for GPS has already been taken by some organizations and those data is available in the internet. And we have to identify all over the world around the station of where we have taken our observation some station should be there will be there where already some people are taking some observation in the same duration and that is made available in the internet. So, those data we those stations we have to identify and then those data we have to download and we have to process those data with our observed data.

So, this is a very important steps which we do to fix the location of our control point with reference to the IGS station available all over the world; then we go for once the data from our station and the data from (Refer Time: 15:06) stations are available all those data gets imported to the post processing software.

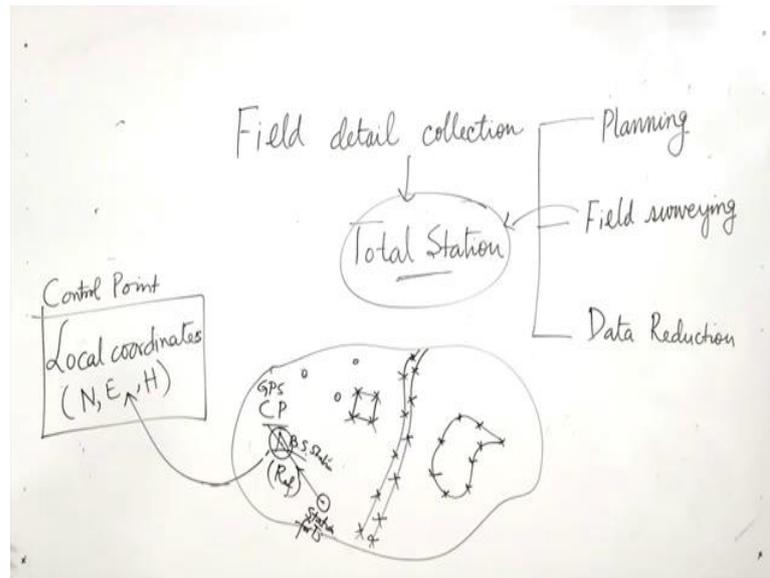
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And we go for processing of data now in processing the data first we should go for baseline processing and then we should go for network analysis. So, and after doing this we will be having the location of our control points in WGS 84 system. Now these coordinate maybe Cartesian coordinate  $x, y, z$  or it may be geodetic coordinate (Refer Time: 16:41) long and height these 2. So, whether it is Cartesian coordinate or geodetic coordinate this has to be convert to local coordinates in terms of north east and height with this our processing of data will complete; that means, at the end of GPS data processing we should be having the local coordinates of the control point local coordinate must be available.

So, the end product of establishment of control point is the determination of local coordinates of the control point in our area to be surveyed in terms of north east and orthometric height once this is available.

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Then we will go for collection of field details. So, to collect the field detail collection in digital land surveying is to be done is done by making use of total station now the collection of field details again consist of 3 steps like planning then field surveying and then data reduction. Now actually whenever we will plan to carry out digital land surveying before we go to the field who should plan well about the data to be collected and their specification means in the field what are the locations, what are the objects, which are the objects we will like to locate or we will like to find out the points and then what is the accuracy of our collection.

Then what will be the frequency of points or how much denser points although which we like to have the alleviation so and many other details which will be learning in coming days all those thing has to be decided before really we start our work and that is to be done during planning stage and. So, once we have decided all those details during planning and then we will go to the field to collect the data using total station.

Now, start with total station suppose this is the area and this is the point control point whose location we have find out by using GPS in terms of north east and orthometric height. So, we should identify some point as the station for our station for total station from which that GPS control point should be visible and setting up our total station at this point we should first, but take the back side this is the back side station to start with the total station work and we should take this direction as the reference direction.

So, the line joining the total station and the GPS control point will be the reference direction and the location of control point will be of GPS control point will be the back side point. This is the thing which we have to emphasize during our collection of field details and with this we can now take the observation at different location or different objects in the area and the location of these. Now location of this points there suppose proposing there is a road there is building oh, you like to get the corners of this building we like to get the salient points on this road. So, all those points maybe there is some river some water bodies like this then we will like to get these points.

So, if we can see all those points from here then directly we will be able this is called this is the radiation and by (Refer Time: 23:35) radiation we can find the we can get the location of these all those important points in terms of north east and height and with this point as the control point. So, in that way we can get the location of all salient points all salient objects and that will be stored in the memory of the total station. So, this can subsequently be downloaded and process using mapping software to prepare the map of the area.

So, in this way we can this is the overview in of the in digital surveying which all those all these points we will elaborately learn in our future classes, like in next class we will be talking on GPS. Next few classes in which we will see really what is GPS, how it works and how to take the data and then how to process the data how to carry out these preprocessing operation than establishment of control point processing and all those details will learn next then after that we will learn the total station the different a parts how would it work how to make use of total station and all those thing.

So, with this I will like to conclude today's class how well I let me summarize the class the fundamental objective of surveying is to collect the geospatial data from the surface of the earth and then to prepare a map in case of digital land surveying. We make use of GPS to collect the or to establish the control point which is subsequently used in total station for collection of location of salient points and then those data which is collected using total station maybe imported to some mapping software for mapping purpose.

So, that is what is being told today in this class and in understanding this class some of the important definitions you need to know that has been given under the glossary and followed by a set of questions has been kept for yourself learning or self preparation.

Thank you.