Digital Land Surveying & Mapping
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Lecture – 34
Automated Mapping

Welcome students, this is the 34th class on Digital Land Surveying and Mapping. In this class I am going to discuss about the different steps that we have to do in preparing a digital map. Now to in this class I will discuss about mapmaking where this point has to be touched upon. Now we can prepare a digital map by making use of mapping software here I have discovered in last few classes and also I have discussed about the different points to be considered during map making and all these things, now here I will like to discuss the thing in sequence.

Now, as you know that to prepare a map we need to do many operations and those operation has to be done in some particular sequence. Nowadays softwares are available which does the work nicely, so we call it automated map operation; however, the maps that has been prepared from software will not be obtained unless some operators are engaged; who does many of the works in between like taking decisions, like selection of modules, like giving different commands. So, we need to know in sequence what are the steps that has to be considered in preparing a map using software and to obtain a digital topographic map.

Now in order to make digital map by making use of different types of mapping software, we have to first know; what is the specification of the map to which we have to take into consideration. Now, specifications already I had discussed in some other classes, but the most important point which has to be considered during preparation of mapmaking is that what will be the scale of the map; that means, what will be the scale in planimetric mapping and what should be the contour interval. Then once we decide about the scale and contour interval we had to go for selection of proper mapping software.

Now there are many software's already I had discussed in some other class which may be used for mapping, some of the software provides us the topographical map and some may be only for planimetric work and some may be for contouring. So, depending upon the availability and meeting the specification we have to select mapping software. Now,

once we select the type of software through which we are going to prepare the map; we should first find out what is the format of the data that software supports; not only format, but also in which way what are the different like.

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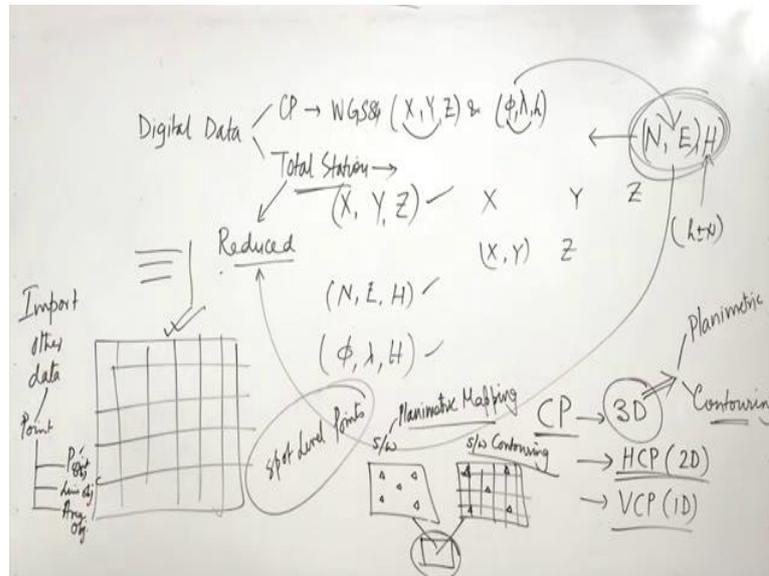
Some software may want to go for data in X, Y, Z format someone may look for N, E, H someone may go for lambda phi h. So, or some individual maybe X, Y, Z individual column then some maybe x and y together and z other column, so how these software will entertain the data that is important.

Now, there are one more thing actually we will like to have our data digital data. Now as we have discussed that we will get the control point data using GPS where we will go get the data in WGS 84 co-ordinate system and WGS provides us the location in X, Y, Z and lambda phi h. Now for our planimetric mapping generally we go for northeast and orthrometric height; orthrometric height is h plus minus n and this X, Y or lambda phi h they have to convert it to this planimitrc.

So, we need to have the data collected from GPS to be transformed to corresponding N, E, H and then the data that will get from total station generally we go for data observation using total station; either directly using the northeast height of the control point then our total station will provide us the data in N, E, H format or sometimes we do make use of local co-ordinate or we assume some co-ordinate for the control point then those co-ordinate it has to be reduced by making use of the control point.
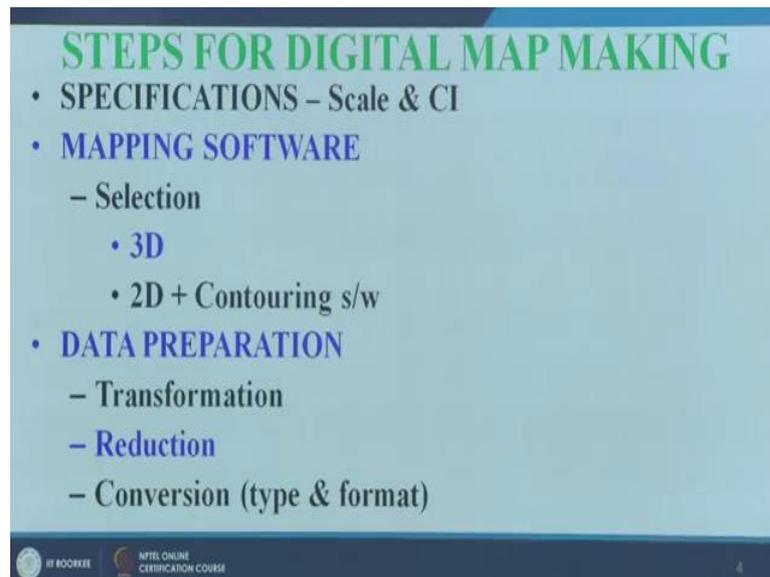
So, transformation and reduction is important after that we have to convert the data total station whatever we have data in different formats, whatever way that software wants couple of things. As well as we have to convert the data in particular format as the software will entertain, so data preparation is a very important part for our map preparation; digital map preparation the observed data has to be processed then transformed, then reduced, then convert in the way that the software entertains. After the preparation of the data we should go first open the software in which we will like to get our map to be prepared.

Now, after opening the software we should go to the module which provides us the grid preparation or which directly provides us grid by clicking it. So, we have to specify the planimetric scale and we have to choose the grid module so that we can get the grid in the palette of the computer. So, this grid preparation should be as per the planimetric scale of the map and then once the grid has been prepared as per our desired scale, we should import to the software the control points which we have established using GPS.

Now as we know that the control map points may be of three types; one is the 3D control point and our maybe horizontal control point which is our 2D control point and it may be vertical control point 1D. So, using GPS generally we have the 3D control point so these control points will solve both for planimetric mapping, as well as for contouring. So,

planimetric mapping as well as contouring both can be done using the 3D control point generally we will establish by GPS array.

Otherwise if there are some points which provides us horizontal control point or vertical control point that has to be noted down and all those control points has to be imported to the software and through import model and then we can make use of appropriate module or we can select appropriate command to plot the control point on the grid already prepared in the desired scale. So, as a result of that we will get a network of control points in the grid which represents the control point in the field. So, then now we can check whether our positioning of control point matches with that we had considered in the field.

So, if it is fine then we should proceed forward, if it is not done we have to find out what are the; if there is an mistake and; that means, those mistakes has to be taken care of because it is the network of control point which provides the base from which hole of the mapping process will carry forward. So, there should not be any mistakes in plotting the control points or their mutual position. Once we have the control point established on the specified scale grid then we should import the other points, import other data.

Now data will be consisting of point data, line data and aerial data, but; however, all these data will be in the form of points only. So, all those point called we have to import to the software and then we can ask appropriate command which we can go for appropriate command to bring those point establish or brooded on the grid. Now, from these clouded points now we have to identify which points or the point objects which of the line object point object, line object and area object.

So, this is the point where we have to work as an operator to identify the point object, line object and area object. Once we identify the point object that has been plotted in this way then we should identify particularly which point represents good objective and corresponding to that particular object; we have to note down the appropriate symbols. Now for Indian topographic map, we have to make use of survey of India topographic map symbols.

Now, next we have to identify the points which represent some linear objects like the kernel of roads or maybe some ponds or rivers. So, all those point has to identified then we can make use of the line command to join those points. So, by using by doing that we

can get the linear object plotted in the map and corresponding to linear object definitely there will be some symbols and we have to convert that linear object plotting as this symbol represents.

Further for the area object points which we will be representing the area again we can identify we have to identify and we have to locate the (Refer Time: 14:21) points for which has to be area. So, through a closed line we have to join all those points and appropriate symbol for that area has to be used. In that way we can plot the planimetric or position of the different type of object that is present on the field and then we have to check whether the object that we want to represent from the field all those objects has been represented or not. If the objects are not properly represented on the deficiency in number of objects or any lacking in objects then we can do the necessary corrective measures to edit, to incorporate, to modify our planimetric mapping plot.

Then after that thing we should go for now identifying the points whose are represents the spot levels, spot level points. So, we should identify the spot level points and then through those points we can ask the module of contouring or we can activate the command for contouring and we can ask for contour to be generated through these points. Now while will be generating the contours there will be some options regarding the type of interpolation that we had to adopt.

Now for that we need to have the knowledge about interpolation and their mutual advantages and disadvantages. So, accordingly we should select now, but the most important way to justify about the method of interpolation is that by selecting a particular interpolation technique we should find that the contours represent properly what really t field has. So, we have the knowledge about the field and we should have the knowledge about the different terrain features of the field should appear in a contour and then we should see through any technique; interpolation technique whether our field is represented field features are represented the way it should be represented. So, this is a very important thing to selection of interpolation technique by changing this interpretation technique our representation may vary and the knowledge of contours and its possible representation is required to get the appropriate contour in the map.

Now, in some cases we may go for planimetric mapping and control mapping differently means we make use of some software which will used or software for planimetric

mapping. So, if we make use of software only for planimetric mapping then we have to apply the same method as we have told before contouring; that means, before opening the software we should convert our data as the software will entertain and after that software will be opened and that data; first control point data has to be before that first we have to go for the grids as per the scale which we will require and then as per the control point has to be established means protect important and plotted and then the other points has to be imported and get plotted then we have to identify the points which represent point object and those points has to be represented throughout the appropriate symbols, the points which represent the line object has to be identified and this has to be joined by line module and then appropriate symbol has to be incorporated for the area objects.

We have to again identify these points and then the area object has to be represented by a symbol. So, this is the way how planimetric mapping will be completed and then we will have the software for contouring further also. First we have to modify our data, reduce our data the way it will be entertained by the contouring software and then that software is to be opened and the data has to be imported and using the appropriate imported and before taking the data into the map making contouring first we have to make the grids as per the horizontal scale and then we should address the points along with the spots levels, then we can ask to plot the contours as per our contour interval and that way we will be able to get the contours.

Now because topographic map is a summation of planimetric map and contour map, so to generate the map out of these planimetric map and flow you should available these two map by making use of the grids as well as the contour points that has been plotted identical control point that has been present in both the maps. So, we should make use of those control points as the identical object and using those as the basis we can merge one map over other that is called a registration. So, by registering the planimetric mapping map with the contour map, we can get the topographic map.

Now, hold the topography map either independently or by registration whatever we get the topographic map, we have to now check our all the details as well as the contours whether the details whatever available in the map is actually representing, whatever available in the field and whatever contours that the map is representing whether it is representing the appropriate terrain nature of the field or not. If it is find, if it is not then

we have to do all the necessary acting measure like it maybe that the if there is the missing of data than we have to collect the data and we have to incorporate the data, if there is a missing during plotting then we have to plot it and then we have to do it if there is a missing in identification then we have to identify properly.

So, there may be different reason why this map is not matching with the frame. So, we have to identify the reason accordingly corrective measure has to be taken and we have to generate the map as per the specification required for the purpose and also we have to see whether our map will solve the purpose for which this map is being prepared. Like if I want to prepare a topographic map for developing an area for construction of building, so for construction of building we need to have the contour interval like 0.2 meter; so we have to see whether the contours are 0.2 meter or not.

And there may be so many objects which are important for construction of building in that area, now all those objects are present here or not. So, all those thing you have to see and we should be satisfied with the whatever is present in the field has been represented in the map. Once we have satisfied with this representation then we should go for further detailing about the map making; like we need to provide many cartographic elements that really important for a map making, the most important element is the representation of the scale.

So, already I had told you in some other class that scale may be represented in 3 years, but generally in topography map we give the graphical scale as well as representative refraction. So, these are the two scales; the both these scale are given in a topographic map; this is the most important and next important is the contour interval and one thing has to be noted down that for in a particular map, the contour interval is constant. So, contour interval also has to be given in the map has to be noted down in the map, another important feature of a topographic map in the direction of the north. So, now direction has to be noted down in the map; other important features like the (Refer Time: 24:46) set; (Refer Time: 24:47) set means (Refer Time: 24:48) table or (Refer Time: 24:51) chart; (Refer Time: 24:53) chart means it is the symbols along with their meaning.

So, whatever symbols are available or represented or shown in the map all those symbols along with their meaning has to be given in a form of chart. So, that is important than many topographic map also may require to have some text to be written. So, like the

name of the river or some salient objects name, so all those texts has to be written then the map also should bear the name of the person or organization who has prepared it and what is his standing and all these thing.

So, once all these elements has been written and all the objects are representing the field is present here and the user is satisfied with its preparation then we should go for having the final output of the map by making use of automatic plotter. The size of the map should be as per the convenience of the user, so in that way we can get the map in hard copy; however, the digital format of the map will be available in the computer. So, that map we may change the scale as per our need, we may transfer that map even in digital format to the user, we may take the map in hard copy, in small size map or in still bigger map size; so all this thing we can do using the finally, prepared map.

So, with this I like to conclude today's class and for next class I will be discussing on the different steps that has to be taken or done in Digital Land Surveying and Mapping. So that to starting from digital surveying to mapping, all the different steps in sequence will be discussed in the next class.

Thank you.