

Course Name: Technical Communication for Engineers

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Week- 13

Lecture 13- Key elements of a map figure

Hello everyone and welcome to a new discussion which we are going to have about the key elements of a map or figure under this technical communication course for engineers. We have covered many points but while discussing figures or maps especially maps I am going to talk here that what are the things which we miss. And what are the important points or key elements of a map which we should keep in mind. while including in our presentation whether it is a oral presentation or it is a you know power point presentation or in a print form also, so written presentation. Everywhere we have to take care about how our maps should appear in the reports or in PPT. So, what all good maps should have.

So, one by one we will see all these key elements and you know that the art of map making itself is a subject which is a cartography and which is mostly taught to the either civil engineers or maybe people from earth science domain and others. So, we do not have to go too much details about this art of cartography or you know in that sense. But some common elements which we must keep in our mind. So, these are the golden rules of cartography. There are just few. First one is the title. So, each figure or each map should have a title. While discussing figures, we have also covered this point that each figure or a map, here we are talking mainly about map should have a title. And this title should be in a large font. And also I have discussed this point that the font which we should choose not like Times Roman but like the currently it is being displayed like Arial or Calibri or Helvetica in which you know the thickness of the character, each character does not change within the text or within the character itself. So, in that way when you project or reproduce such things in written form then the quality will not deteriorate. And therefore, the font size should be kept in mind and type of font should be kept in mind that they look good also. But the same time while reproducing these things, the quality of our titles should not deteriorate. You know what we have to do? We have to strike a balance. between the sizes of fonts. Because like within a map, we will be having say legend. And if legend font size is very small whereas our title size is too large then it would look imbalanced. So, we should keep this thing in mind while preparing a layout

of a map. And we will see some bad examples and also obviously good examples of map.

So, if a map is a thematic maybe like you know land use map or maybe a forest cover map, maybe a lithological map then we must mention the title at the top. And if it is related with you know with the time or year. Then the example as shown here that the land use map of study area of 1990 and more specific if we can also mention the month. So, what should be written in title that is one of the way of writing that thing. Similarly, our figure, these things may come within the figure. The title may come in a box or without box. But it should not be over-emphasized, neither under-emphasized. So, balance should be there. Now another very important key element of a map is the scale indicator. You know earlier we were using when we did not have the digital media then we were using the ratio scales. And the drawback with ratio scale that if you enlarge or reduce then the numbers which are written like 1 raise to 50000. Now if I enlarge that map where it is printed 1 raise to 50000 that value is not going to change whereas scale has changed. Therefore, it is necessary instead of using the ratio values, we should use the scale bar in a map. So, whenever it is reduced or enlarged, the bar itself will enlarge or reduce accordingly. And therefore, there should not be. And the important thing that each map should have a scale also. And the scale as a graphic scale or bar scale is very much required. So, when a reader is going through these things, your map or a figure or map figure then the unit of measure of the map should known to you. So, suppose if it is the scale in kilometer, we must mention kilometer, the unit if it is meter or in some may be in other units also. In many countries, they use also still miles. So, that miles can also be used. But kilometre is more common internationally. Third important point is the orientation. And this is again very-2 important about that each map should indicate the direction of the north. Because generally it is assumed that a map or a figure is having a direction north upward. But sometimes because of the orientation of our study area or the size or shape of our study area does not fit very well in a portrait form. It fit very well with the landscape form. And therefore, we might be changing the direction of north. So, instead of north upward, we might be keeping north either east or west. So, while preparing such maps, one should always keep this thing. Because if anything produced and suppose in written form and submitted to a journal, it is highly likely that somebody might raise a question that what is the direction of north and if it is wrongly printed, wrongly given. Even in a PPT, it gives a very bad impression about you know person's understanding about these things. Another thing is the graticules or grid. So, it is not necessary that each figure should have a complete grid of latitude, longitude or easting, nothing depending on what kind of map projection is being used. But there should be some grid marks instead of you know complete grid, you can have at the border, you can have grid marks. So, when we will see the examples, I will again revisit this point. Another important thing is the border or in some software or in some literature, it is also

called neat line. So, basically what border is doing, it is identifying exactly where the map area stops. So, it is declaring the boundary of the map area and it is very important. If we do not keep the boundary then you know for the reader it becomes very-2 difficult to understand. So, it is always good. Now again the thickness of this border should be in a manner that it should not be too thick or too narrow or too thin. So, again a balance has to be there which one can prepare and show again the same practice. Suppose from my end, I have finished a map. Now I should show to some of my colleagues or friends and ask them to tell Is there any imbalance in the font size, thickness of the lines and other things? So, balance has to be always there. Now both the borders which we are having or neat lines we are having, if we keep very thin for example and the map is reduced in a publication.

then what would happen that that might disappear that the thin neat line or thin border might disappear may not display correctly. And therefore, the optimum thickness of the borderline has to be attained. Now another very important thing is the legend. also another term is used index. So, some maps requires the index, some maps requires the legend.

So, if it is a thematic map, it is generally the legend. So, legends if you are using different colours, shades, pattern then every unit which is shown in the map should have what is that meaning. So, suppose if I am having a polygon in my map which is shown as in a red colour. So, in my legend there should be a box for red colour and against that the information or description of that polygon should be there. So, this is another very-2 important thing that each map should have title, each map should have a north symbol, each map should have a scale bar, each map should have a boundary line or border or neat line, each map should have a legend too. And again the size of legend, the font size, font type, again the same point will come here that it should display so clearly but not too emphasized. A balance again legend, the main map and the legend, there should be a balance. Now, many times we take a map from other sources also or take the map from other source and then we work on that and we improve that map. So, it is always necessary to give credit to the map if I have downloaded or have taken from somebody's publication. So, that the map credits or the source of data must be declared.

Because if I have prepared the map then no problem I do not have to give credit to myself. But if I have taken from somebody's work then I must give credit otherwise it will come under that plagiarism. And plagiarism is a crime. So, one has to be very-very, it is a cheating basically. So, one should always avoid, one should give the credit whoever has produced the first map if you have improved on that still you can write his name with prefix like after. So, name of the cartographers in some maps it is also required. So, that can also be given

a date map. of the map that is another important thing is required sometimes for some types of maps. And the data which has been put in the map if that data is also available then it should also be given. For example, I am using in a figure a satellite image.

Now satellite image has that image might have been acquired on a particular day. So, I should know what is that area. or what is that date and that date I should put. So, that whatever the details which are required to understand the map by the reader should all be available. Now map projection itself is a big subject. But anyway, if you are using a map projection, you have changed the map projection then definitely you should write that in what map projection you have produced the scale. If you are using simple latitude, longitude then you need not to include because it is a non-projected data. But if you are using say UTM or grid is easting-northing then you must mention that it is in UTM projection. Now another important thing but it may not require in all figures, maybe the first figure that is the locator map or inset. So, generally what we show in inset, suppose I am working in India. So, in the corner of my map, I would be showing the map of boundary of India or maybe the state boundaries of India. And within that India, I would be showing my study area. So, this is very much required for a person who is not aware about the Indian or very conversant with the Indian geography will know that where it is located. So, it is also called locator map or inset map. So, these are the important thing. Why I said that in very first map in a publication or in a thesis, very first map you must show the location map. And later maps within your thesis or publications need not to show all the time this inset map. So, I will show you the examples here. The example from a published map as you can see I was mentioning about the satellite image. So, you are having here you know in this case you are having a inset map and it is also showing the relevant state boundaries and then study area. And another important thing as few points which we have discussed is about the north and also scale, neat line as you can see here and also the legend. So, what are these lines which are there? And since other details can be put in the figure caption, so those things are here. Now here the date is not important. Therefore, the date has not been given. But within the body of the text or publication, the date of these images are given or this image is given there.

So, one of the ways is to put all these things in the caption but too much text in the title should not be there. Now our aim while preparing maps that we should have a very effective graphical design or very impactful map. And everything within that map should be very clear. So, we should design the layout and then create a very effective layout or design or structure. And therefore, the visual impact of that map becomes very-2 easy.

If you recall the discussion in one of the previous lectures, I have mentioned that when somebody is going through a publication, what he does that first he will read the title then abstract, maybe introduction part. Then he starts going through the figures and maps. And

if these things are drawn nicely, maps are very well you know designed. their layouts are very well designed. All key ingredients, key elements of a map are there. The first you are earning very positive points at the beginning before he goes through the entire manuscript or entire thesis. So, therefore these are very-2 important thing that our maps should have all key elements. So, most of these we have already discussed. So, map should be neatly drawn here that means that map should not be cluttered with lot of information. Only relevant information should come in a map or figure.

Rest of the information can go in the caption or in the body of the text. Second point is appropriately and consistently generalized depending on what you want to emphasize in a map. So, if I take back to here then the boundary of India or state boundaries are generalized. All details of Indian boundaries are not shown here.

It is a generalized boundary. Because the purpose here for this inset map or locator map just to show the study area within India. So, therefore it is not required to have all details. So, a generalized map can be put there. Other important point is systematically balanced.

We should have a balance. Not too large fonts, not too small fonts, not too thick lines or too thin lines. A balance has to be there and as I mentioned, no cluttering. So, you know once somebody has prepared a map, should show to his colleagues, friends and then get the feedback. And I am sure that they would give some suggestions which will further improve your map. Now, another important thing while preparing maps or figures is the visual hierarchy. So, it is a hierarchy of symbology. Symbology means what kind of colours you are using, what kind of symbols you are using, all that thing. So, all kind of letters or fonts which you are using. So, the 3 points lettering that means your fonts size and type of font, line width means the thickness of lines and shading. These things are again very important. And another one important thing you can add the colours. So, if you are using colours, colours should not be too bright or too dull. Because remember all the time that the map which you are going to produce will be reproduced. in whether it will be projected through a PPT or multimedia projector or it might go into publication. And therefore, the colour should be chosen or pattern or shading should be chosen in a way that whenever it is reproduced, the quality of your map or visual hierarchy is not lost. So, overweight, underweight of the features, lines, fonts should always be avoided.

And another important point and the purpose and this is again why you have prepared a map. So, a map should not unnecessarily be put in a thesis or a manuscript or in a powerpoint presentation. And if it is required then it should be very obvious that why this map is inside there. So, one should have to have all this idea and this starts of course from a simple beginning. Now another example from a published work that we wanted to show you the directions of certain features. Here the features are the lineaments. And we

wanted to also show the grid. So, the long grid is there, scale is there, the legend is there. What is this figure? That is also there. North is there and neat line is also there.

And of course, caption and the title, everything is there. So, that makes your map complete. And thickness of the lines or neat lines, other things are such that if it is reduced by 50%, still it will not lose the quality. So, the optimum thickness has to be there. Of course, if somebody reduced to a stamp size then definitely the quality will reduce but nobody is going to do it. So, it might be reduced to one-fourth or half and you know then it will not create any problem in the quality. Again a map with the inset example is here, Legend is here, North is here. These tick marks, latitude, longitude, grid marks are there, not complete grid. In the previous example, you have seen completely grid. And instead of here it has been mentioned reservoir and individual reservoir names are also coming. And of course, you are having caption and title everything. And because these maps were prepared by ourselves and therefore, I am not talking credit to the map maker because these are our be prepared. But if I would not have prepared taken from somebody then thing. Now whenever you are going for colours then one has to be little careful about the colours that whenever these are reproduced or projected, the colours should not lose. And this is the one of the examples. and that only 4 colours have been used and you are having the north, legend and scale and everything.

The only point missing is the lat long grid here, nothing else. Another important example again latitude-longitude grid is there, scale is there and then legend is there. Then the study area, map is there, north is there. Everything whatever is required, whatever we have just discussed almost everything are present necessary in avoiding cluttering. So, this is another important thing. And another very important thing which I should not miss to tell you that like this map is in the landscape. Earlier map could have been fit in a portrait also. So, depending on the shape of your area like this fits very well in landscape. So, we should prepare in landscape rather than in portrait. Or if I have to prepare in that manner then I should keep in mind what is the direction of the north. So, these things should be kept in mind and one can really produce good maps of the same area but different colours have been used here, legends are there and all those key elements which we have discussed are also there. It is not necessary that your legend you should put in a box. It depends how sometimes we have without box we put the legend or sometimes with box. You can try because after all these one would be preparing on a computer using certain software maybe GIS, Cora I DRAW kind of thing. So, one should put and then see whether that one looks better or not. There is no but I am trying to say there is no hard and fast rule. Now, since we are talking about digital world and lot of information available on net. So, these are the PowerPoint contains an integrated world map. So, that can also be used for locator map or any other thing. And this map can be incorporated in your presentation or whether it is written or oral. If I take example from GIS software

like ArcGIS maps and then again I can add a map to a slide very easily. So, many data like country's boundary or drainage lines or road network of the world, they are available on that. So, why to recreate? You can just download. However, if you are downloading or adding through these softwares, you must mention that the source of data is such and such that the credit for the map has to be given to someone. Now let us see bad examples of map. So, this is a bad example of a geological map. What is bad here is that too many polygons and too bright colours and little confusing also. And instead of using within this legend, instead of using colours as in the box, they have put the numbers you know.

Humans are very good with colours but they are not as good as with numbers. So, therefore, numbers should have been avoided. The colour should have been used. So, this is one of the bad point here. Another thing is that the scale should have been like this. This scale bar should have been like this so that one knows and if a division can also be shown that is another variable. Now this map has been oriented. So, it has been oriented. So, see this is the longitude and this longitude is going like this but the north has not been rotated. So, we know that the major axis of the north symbol should be parallel to the longitude. So, this is another mistake in this map. Another mistake is in the numbers.

See this third number is here, third number is here. So, one does not know which third number is, which unit is. They are not visible. Again there should have been clear lines for all polygon units of different geological features or units which are there. Another bad examples of a map is that it shows the boundaries of independent nation as well as some dependent territories. Now, here like for if I take the map of India, it does not shows the real boundaries of India, neither it shows all three colours of our tri-colour or national flag. Similarly, for Russia, it is also not there. So, it is a very bad way of representing the world boundaries. And you know large part of the world is shown with this kind of symbology which is not anybody's flag of these nations which are covered in this one. Similarly, here for USA and Canada and you know North Pole region and other thing, they have shown everything in the American flag. So, again it does not look very nice. So, it is another bad example of a map. Another bad example of a political map is like mentioning here the Russia and not Russia. is a really very poor kind of examples of the map. So, these things should not be there. The map, there is no neat line, no scale, nothing. Such maps are completely useless and they will give a complete wrong impression about your professionalism. So, such things should always be avoided. So, finally we are coming to end of this particular discussion. So, in the nutshell what we should keep in mind while preparing a good map and if we do not keep then it becomes a bad map. So, we have seen the examples of good maps and bad maps. So, in nutshell what we are going to do? Colour choices have to be very careful.

Legend size and styling again try and error. Sometimes you start liking one styling, no

problem. But others should also appreciate. Level of details, again there has to be balance. Too much information is not good means the cluttering should not be there.

But whereas the required details must be there. So, again there is a balance. Same with the font and font size means font style and font size. Scale has to be there. The direction that is the north symbol has to be there. Latitude, longitude, grid or tick marks should be there.

And a map should be clean not cluttered. Clean does not mean that you just give a blank sheet. No, clean means everything is nicely drawn. The layout has been designed very nicely and your map looks very impressive, effective and can give a good impression about your professionalism. So, now I am going to end this discussion. This is last slide on this. See that all these points which we have discussed are shown on the right side figure. Though the example from USA in the map does not matter we can fit this one for India also. Therefore, on the left side the Indian map is also shown. So, everything like if I take example of legend, title, border, neat line, figure. and the main part and then inset or locator map and other places names are also there if it is not getting too cluttered and the north arrow is also there and credit, map credit is also there. Another last point which I want to cover here or discuss this thing that whatever the space is available for you, one should utilize. Like in this example, on the right side, almost entire space of your page or slide has been utilized. If the state boundaries of USA should have been shown in a more smaller map and inset map is relatively larger, then it does not look nice. So, the main thing is to show the boundaries of the states here. And therefore, that should occupy the maximum space, rest can occupy the less space or required whatever the essential space that much should be given because our emphasis on the main boundaries of the state. So, this one thing should keep in mind whether preparing PPTs or this that whatever space in terms of page or slide is available, we must utilize without cluttering. So, with this I thank you all. Namaskar!