

Urban Transportation Planning
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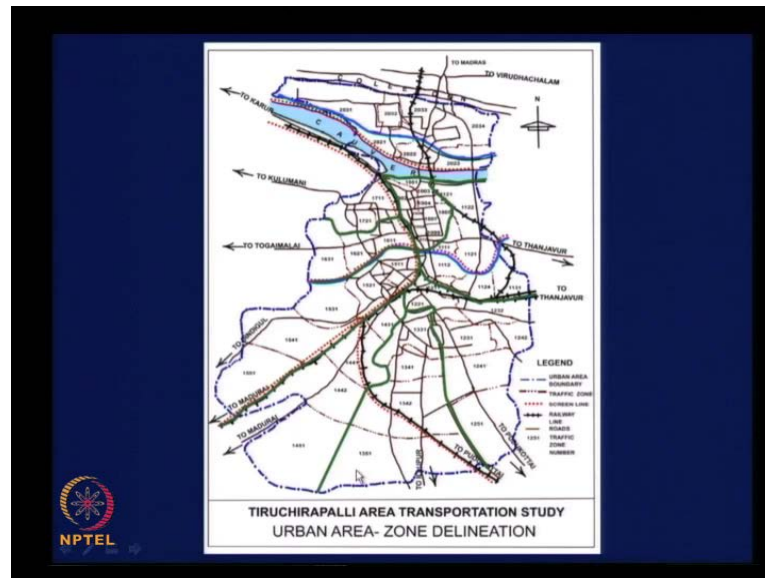
Lecture No. # 32
Transportation Surveys Contd.

This is lecture 32 on urban transportation planning, we will continue our discussion on transportation service in this class. In the previous class, you may recall that, we mainly discussed about delineation of the study area for the purpose of transportation planning using an imaginary line, name - external cordon line or outer cordon.

Then, we discussed about division of the delineated urban area into smaller land users; if the urban area considered is large, then it was suggested that, initially the urban area can be divided into sectors. And then, each sector can be divided into traffic zones, and if necessary each of the traffic zones can be further divided into sub zones. In that connection, we also discussed about coding of the sectors, zones, and sub zones. You may recall the sector numbering starts from C B D with number 0, and then, we numbered the sectors normally in clock wise direction starting from 1 to 8, within a cordon line area.

And number 9 is reserved to indicate area out side your external cordon line, then while dividing each sector into number of zones, we number the zones by numbering them from 0 to 9, normally each sector is divided into 10 traffic zones. In certain cases, it could be less also, it depends upon the size of a sector **right**, and then each zone can be divided into 10 sub zones numbering them from 0 to 9 again. So, when you come across a sub zone number of 8, 3, 8, 6 as per the coding, this number indicates that this is a sub zone with number 6 in zone 8 in sector 3; that is the meaning of 3, 8, 6 **right**. And finally, I just indicated to you how the external and internal cordons were fixed for Tiruchirappalli city.

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Now, let us see how zoning was done for this particular city. We will first consider the area enclosed by the internal cordon line namely the area within the municipal boundary **right**. And this is how the zoning was done you need not have to worry about reading the numbers, you broadly look at the size of the zones first. This is the C B D area, this is the heart of Tiruchirappalli city, which has got influence over other two municipal towns. In fact, this is a parent city, and the other two municipality is developed later **right**; so you can say for the urban area, this is a C B D, since it is heavily built up, and activities are intense, this area has been divided into very small land use process **right**.

And as you go further away from C B D, you can see that the zone size gradually increases **right**, and you can see the size of the zone here at the periphery peripheral area compare to the size here, it is based on the guide lines about which we had discussion earlier **right**. Zone size need not be same geographically, it can vary it depends on the intensity of the activity related to the traffic zones **right**. And look at the green lines, what are these green lines? These green lines are sector boundaries.

Actually the area enclosed by this green line, and this one is 1 sector. Please note in our earlier discussion, we understood this sector boundaries to be either natural or manmade barriers; like railway lines, major roads, rivers, and things like that, **that** can be adopted or followed if possible.

If necessary you can have a different guide line to fix the sector boundary. What they have done here is they have just taken the revenue boundary or they consecutive what boundaries as a guide line. So, that within a sector they will have **they will have** a clear cut number of traffic zones **right**, if a sector line passes through the middle of a traffic zone, then there will be a confusion. Is it not? So, when you take sector line along the zone boundaries, then you end up with this kind of curve irregular shape for sector boundaries. So, that is what they have done? You can also see that sector size is not same they are different, it is only for convenience. And each sector will have a different type of coding.

And the Srirangam being a kind of island city between two rivers, this was considered as a separate sector **right**, and sector division for Tiruchirappalli, and golden rock were continued together, because geographically its one unit, they did not segregate a golden rock from Srirangam town, clear. So, this how in practice you have to fix your sector boundary, and this boundary should extend over the peripheral area, because your external cordon line is beyond this urban area, this is only urban are and when you extend this sectoral division to the rest of the planning area.

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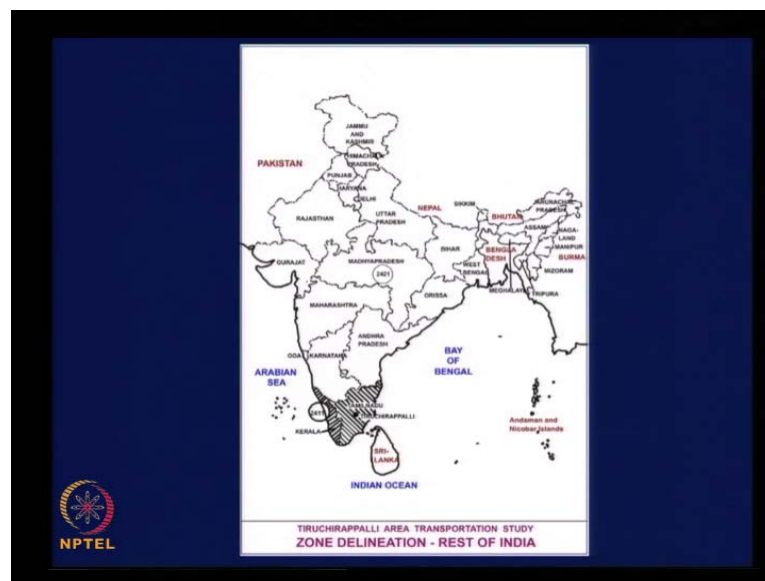


The extension is like this. You see this is a extension of the sector division, this is the urban area you can just recognize from the shape, we have not shown any sectoral division here, I am showing the sectoral division only for the area outside the municipal

So, that if some trip is emanating from adjoining district, you can identify the trip with that code number, and if you go beyond the number of trips that encounter may not be that many, in that case you can cover large number of districts together as 1 unit.

That is how to cover the whole of the southern part of the Tamilnadu state the given only one number here, and south eastern part there is 1 number shown here, and north west 1 number, and northern part another number. So, trip emanating from here, here, here, and everywhere will be coded with the same number, does not matter, because the number of trips are going to be relatively less. And is it the end of the story shall we stop the zoning process with the state level no, somebody would have arrived from Delhi at Tiruchirappalli on a particular day on which you are conducting your survey. So, the zoning should extend beyond your state to cover the whole of the country. If you want to record all the trips systematically with some code number, **right**.

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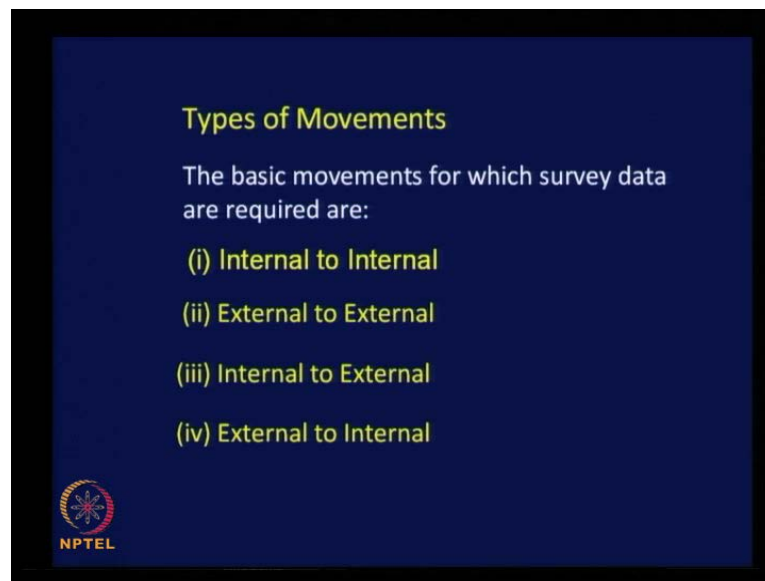


So, we have to extend the coding beyond the state. So, we discussed about coding within the state, and Kerala being the adjacent state. The likely hood of people making more trips into the state is higher. So, we have given a separate number for Kerala state, and rest of the country is given one number. Whether a person is arriving from Andra Pradesh, Madhya Pradesh or Himachal Pradesh; the code number will be only one, does not matter, because number of trips are going to be relatively small, sometimes

negligible, but still you must have indicated the entire country with some code number. So, that you do not miss out any trip in your analysis, clear.

Now, you can now feel that this is the end of the zoning process; start from the planning area go beyond adjacent districts, and then cover the whole of the state, and then whole of the country, clear.

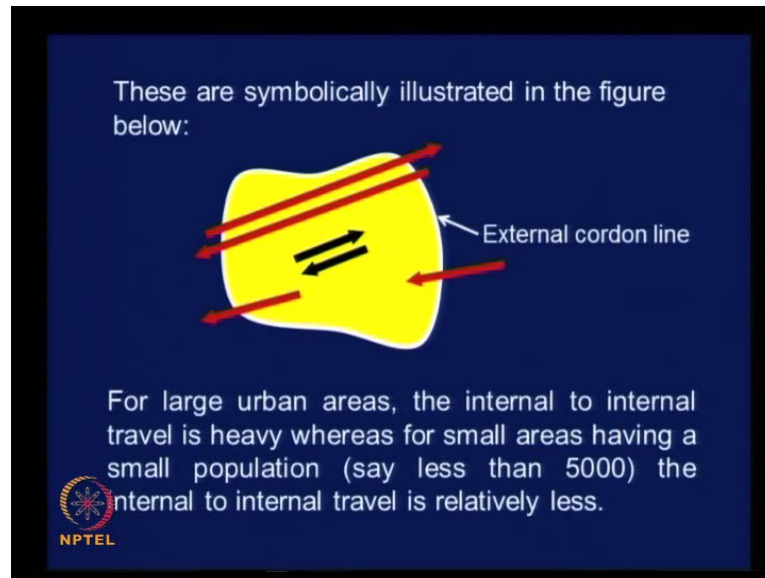
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Now, let us think about the type of service to be conducted to capture information about the traffic movement in the planning area, and it is better to classify the trips broadly.

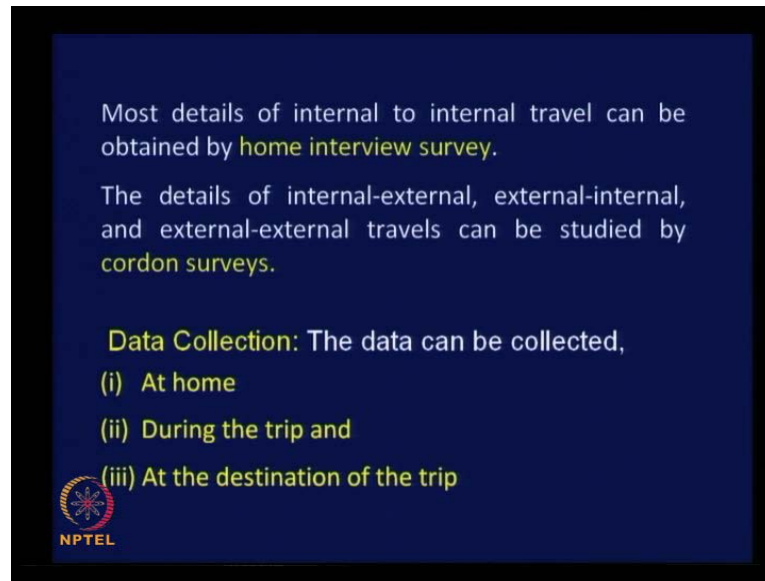
So, that we are clear as to what we do really, while conducting a particular type of survey. The basic movements for which survey data required or internal to internal external to external internal to external, and external to internal **right**, these are the possible types of trips, if you broadly classify the trips based on the delineated study area.

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To understand the same thing pictorially, you can look at this picture. This is what we need? The black ones are internal to internal trips, these are external to external trips; they do not have any horizon or destination study area, but still these trips pass through your study area. External to external, **external** to internal, and internal to external trips. So, we have four different categories of trips for which data has to be collected. For large urban areas the internal to internal travel is heavy, because area is large; obviously, internal to internal trips you worked it as a percentage will be much higher, whereas for small areas having a small population say less than 5000 just a town. The internal to internal travel area is relatively less why trips might emanate from somewhere, and end up in your town and vice versa.

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Most details of internal to internal travel can be obtained by home interview survey.

The details of internal-external, external-internal, and external-external travels can be studied by cordon surveys.

Data Collection: The data can be collected,

- (i) At home
- (ii) During the trip and
- (iii) At the destination of the trip



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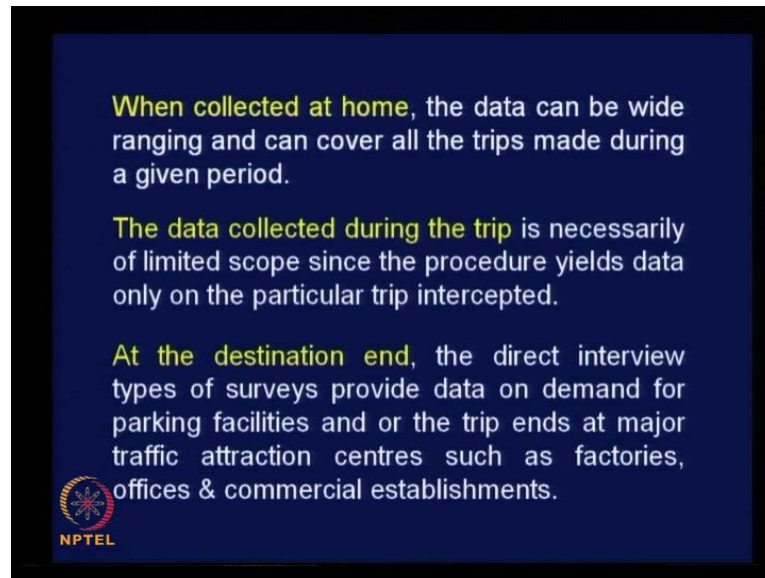
Most details of internal to internal travel can be obtained by home interview survey. By conducting home interview survey, you can get almost all the information about internal to internal travel, trips made within your study area. The details of internal external, external internal, and external external travel can be studied by cordon line surveys or cordon surveys.

What do you understand by cordon surveys? The surveys that will be conducted at a convenient point on the cordon line or at the point of intersection of radiating roads, and the cordon lines. So, through those services only, you will be able to get information about the other three categories of trips; the external to external, external to internal as well as internal to external.

And data collection in general can be done by three possible ways, you can meet people at home, and collect the information about the trips made by each member of the family right, that is on way or during a trip, you can just capture passengers in a train or bus or on the road side people making use of all kinds of vehicles, and get some information about trip right; these are possibilities.

Another possibility is at the destination of the trip, when they are coming in parking their vehicle at their destination, you can capture them and get some information about the trip right.

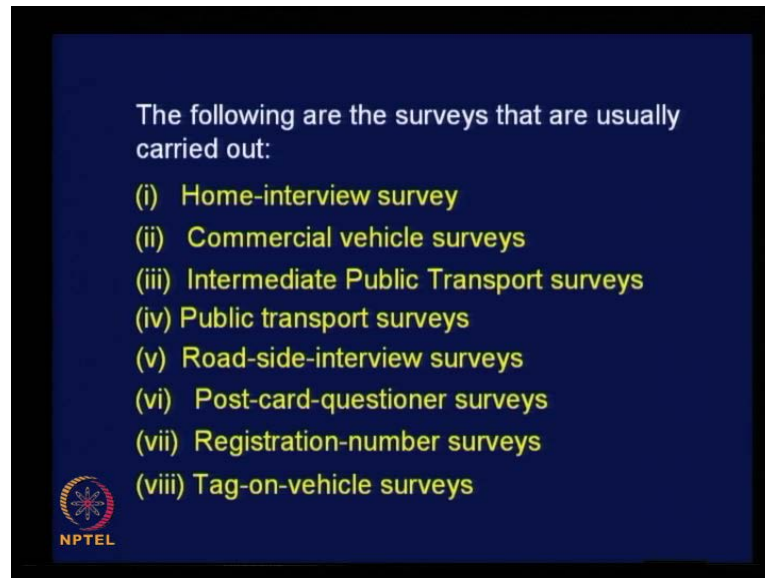
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Obviously, when collected at home the data can be wide ranging, and can cover all trips make during a given period. You can ask information about all trips make in the whole of the day or whole of the week whatever, such information can be collected conveniently at home **right**, but the data collected during a trip connect be very comprehensive. Is it not? Its normally limited to only that particular trip, you will be able to get the information only with regard to that trip, you can ask a person where from you are coming, and where are you going **right**. And the mode use to **(())** provide the person is known to you, because your capturing the person during travel. At the destination end, the direct interview type of service provide data on demand for parking facilities, if you are interested to get data on demand for parking, you capture people one day come, and park their vehicle at the destination point.


Or trip ends at the major traffic attraction centers like factories, other work places **right**; such as factories, offices, and commercial establishments. You can get information about a trip attraction, number of trip ends at a particular period of time or the whole of the day depending upon your ability.

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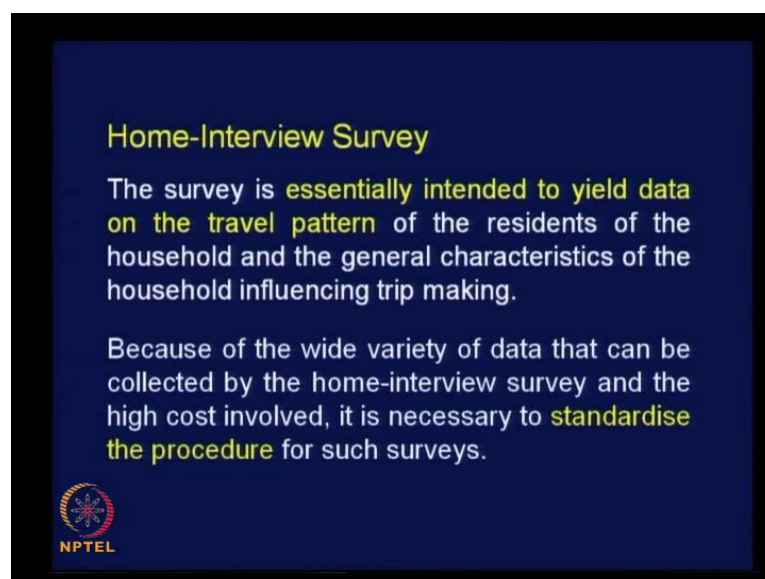
The following are the surveys that are usually carried out:

- (i) Home-interview survey
- (ii) Commercial vehicle surveys
- (iii) Intermediate Public Transport surveys
- (iv) Public transport surveys
- (v) Road-side-interview surveys
- (vi) Post-card-questioner surveys
- (vii) Registration-number surveys
- (viii) Tag-on-vehicle surveys

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And let us try to list the different types of service, normally conducted to capture information about the different types of trips that we listed earlier; internal to internal **right**, external to external, **external** internal, and internal external. The most important type of survey is home interview survey, then commercial vehicle surveys, intermediate public transport surveys, then public transport survey, road side interview survey, post card questioner surveys, registration number survey, and tag on vehicle surveys. Normally, 8 different types of surveys are conducted to capture information about these different categories of trips that we have listed earlier.


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Home-Interview Survey

The survey is **essentially intended to yield data on the travel pattern** of the residents of the household and the general characteristics of the household influencing trip making.

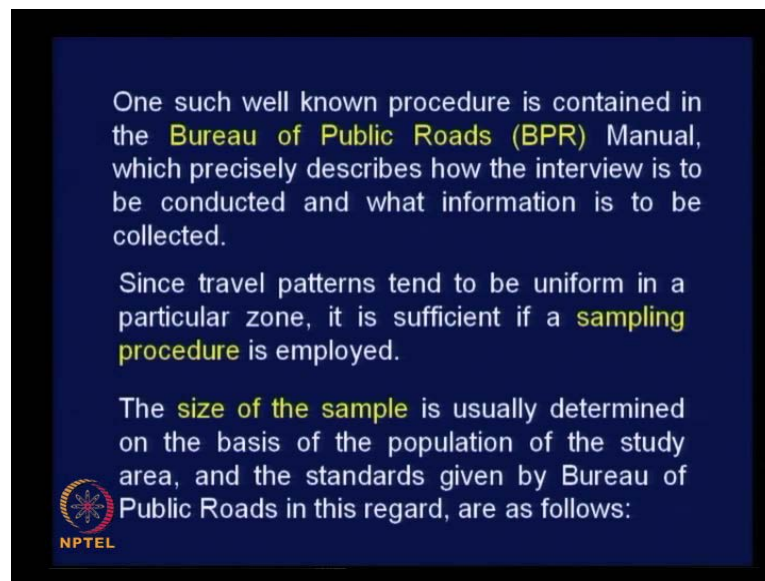
Because of the wide variety of data that can be collected by the home-interview survey and the high cost involved, it is necessary to **standardise the procedure** for such surveys.

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We will discuss about each one these surveys in detail starting with home interview survey (()). Of course, the purpose of the survey is known to you, this is essentially intended to give data on travel pattern in the urban area, of the residents, of the household. And the general characteristics of the household influencing trip making, these are the two things we are interested in. The actual travel made by the households, and information related with the factors that influence travel or that influence the trips make by the members of the household, that is our interest. Because we need data on these aspects to develop trip production modes right.

Because of the wide variety of data that can be collected by the home interview survey, and the high cost involved it is necessary to standardize a procedure for such surveys, is very expensive, because we need to have lot of personal to meet the members of the household at home covering the whole of the urban area. It is going to be highly expensive, and time consuming right. So, we need to have some standard procedure.

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One such well known procedure is contained in the bureau of public roads BPR manual, this manual precisely describes how the interview is to be conducted, and what information is to be collected. Even though generally we know what is to be done, but BPR gives a detailed information about the same procedure.

And since travel patterns tend to be uniform in a particular zone, it is sufficient; if a sampling procedure is employed, this is a very very important statement. Since, travel

pattern tend to be uniform in a particular zone - particular traffic zone, it is sufficient; if a sampling procedure is employed; this implies that, if there are 1000 households in a traffic zone, you are not going to collect information from all the households. You are going to have a sample, certain percentage of the households only will be covered for home interview survey, the reason is this.

Travel pattern tend to be uniform in a particular zone, do you agree with this statement or you convinced the travel pattern will be uniform at a particular traffic zone. What you understand the uniform? It is a very general statement, uniform here means the time of start, and time of finish of trips by most people in a traffic zone for a particular purpose might be same for work, for education, and so on, **right**. And the trip length related to the different types of trips make from that particular zone will be more or less uniform.

It is not as kind of astrology I am talking about **right**, we should be convinced about this statement, and we should accept this, otherwise will not be able to proceed further with the sampling process. To understand this, we should understand the pattern of fixing of residences by urban dwellers, suppose you migrate to a city - Chennai city, and try to fix a location for your residence. You want to rent a flat **right**, and what are the factors that will influence a location of a residence. Obviously, the location of your employment place - **place** of employment.

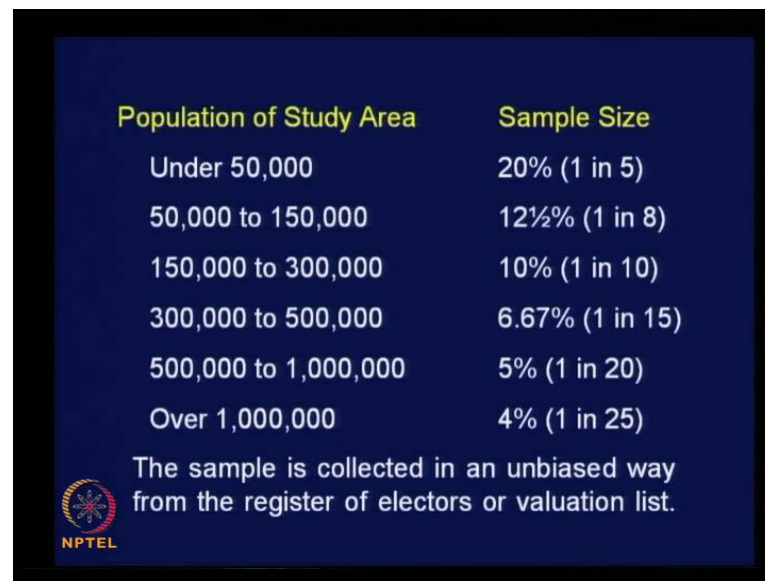
And if you have children, then a location of a decent school **right**, then other factors are the location of medical facilities, shopping areas at least for minor shopping activities **right**. These are the factors that will influence the fixing of residence by urban dwellers **right**. So, you try to optimize the travel distance in the process **right**, you not like to have a residence about 30 kilometers away from your work place **right**, and you also would like to have a residence as close to school as possible, if we have child to we put into a school **right**. So, all these balancing act will make people to end up with a particular location **right** or particular traffic zone, from that traffic zone if you look at the pattern of travel of people, who are living there? They would have fixed this location with respect to their work place, education institution location, shopping areas, health facilities and so on will be more or less same.

Do you agree with that are not, that is the that is how people settle down in different pockets in urban areas; that is how we can be convinced they are not 100 percent,

generally we can get convinced that travel pattern from a traffic zone is most likely to be uniform. In terms of intensity of trip, trip length and kind of mode used by people and so on, right.


And if you agree on this aspect then we can accept this sampling process, because when the travel is going to be uniform instead of interviewing all the households, you can go in for sampling. In the sampling process, you should take care to cover all socioeconomic groups within a zone, that we can take care; if you take care of that particular aspect, then your sample will be really representative of the population, clear. The size of the sample is usually determined on the basis of the population of the study area, another interesting statement; sample size is related to population of the study area, and the standards given by bureau of public roads in this regard are as follows. I can give you the sample sizes, but we should be able to answer this question. Why the sample size is related to the size of the urban area, in terms of say population.

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Population of Study Area	Sample Size
Under 50,000	20% (1 in 5)
50,000 to 150,000	12½% (1 in 8)
150,000 to 300,000	10% (1 in 10)
300,000 to 500,000	6.67% (1 in 15)
500,000 to 1,000,000	5% (1 in 20)
Over 1,000,000	4% (1 in 25)

The sample is collected in an unbiased way from the register of electors or valuation list.



Look at the sample sizes given by or suggested by BPR, if the urban area has population less and 50000, sample size is 20 percent, right, 1 household out of every 5 household should be interviewed. If the population is between 50000 and 150000, then sample size is 12 and a half percent 1 in 8, 150000 to 300000, 10 percent 1 in 10, and 300000 to 500000 6.67, 1 in 15 right. And 500000 to 1000 or 1 million it is 5 percent 1 in 20, and over 1 million 4 percent or 1 in 25. Can you justify the smaller sample for larger

population, how do we accept this proposal. What is the basis on which they given this percentages. Why 20 percent for very small city, and just 4 percent for a large cities with the population more than a million. See, by sampling we should be able to capture a variations in terms of socioeconomic characteristics among the households, that is a purpose.

We cannot just live out one section, and capture only one section. We know that there is a wide variation in the socioeconomic characteristics of households in our country **right**, in terms of monthly income, vehicle ownership even on the size of residences, and so on; there is going to be a wide variation **right**. This range is same, whether a city is small or big, is it not. Range is going to be same. So, when the cities population is 50000, within 50000 you are going to have so many categories of people with wide range of income, and wide range of socioeconomic characteristics.

So, if you want to capture all these variations within the small population; obviously, you must capture more number of households, is it not? Covering all these variations, if you do so, it works out to a higher percentage of a small number - **number** is small, but minimum required number of observations is more, because you want to capture the whole of the variation. Even though in absolute terms, the number of households interview maybe relatively small **right**, when I when you work out this number as percentage of the population, when the population is small, the percentage works out to be high, 20 percent understand.

And when the population is huge, every zone will have this kind of variation in one zone, we have large number of people living **right**, and it is possible for you to capture this variation with a certain number of households, because in total if you count the total number of households that you capture with cities of 1 million population, that number is going to be very large compare to the total number in absolute terms, a terms for smaller cities **right**. You physically capture more number of households, but when you work out the number as a percentage of the total population, it works out to be less; still it is as a purpose. Is it not?

The range of variation is same irrespective of the number of people living, that is how a smaller sample size is acceptable for a large cities. Are you convinced? I am not trying to convince you, you should get convinced **right**; that is how BPR as a recommended this

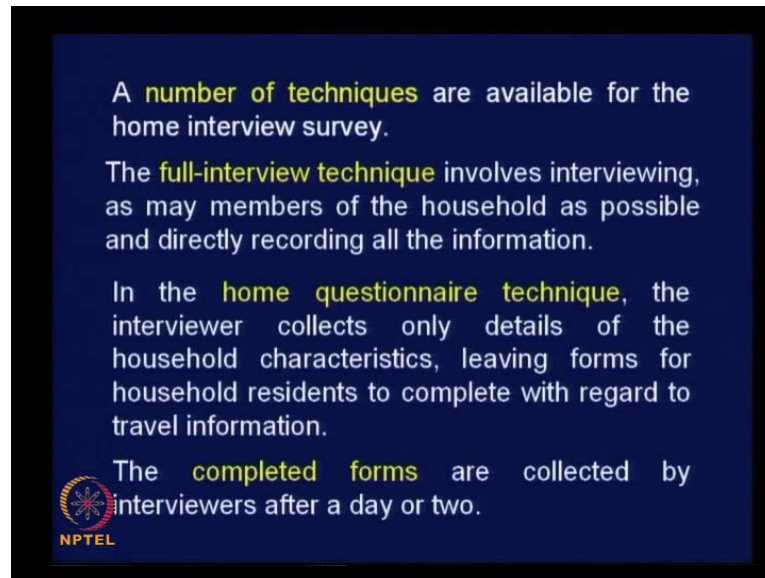
kind of sample size, now the related question is this. Shall we accept this sample sizes to be valid for our condition. All the BPR recommendation are based on American conditions. The socioeconomic characteristics prevailing in America **right**, can we directly accept take these percentages, as valid percentages for our condition **yes** or no, clearly no. Why no?

The socioeconomic character differs from the **(())** American standards to our standards.

Yes, the point is the socioeconomic characteristics are wide ranging in India compare to America **right**, for a relatively lesser range - narrow range they have indicated these percentages. And we have a very wide range; obviously, we need to have a larger sample or smaller sample. Larger sample size, how large? It should be. Of course, it is a difficult question for you to answer, but in my opinion you can simply double this numbers for our condition **right**, for population of 1 million and above, the sample size in my opinion should be at least 8 percent.

That is what we use to recommend to the urban development authorities, even though it is expensive, if we are interested in accurate database to really represent the population. We need to have a larger sample for some more time, until we touch the conditions prevailing in developed countries, clear. Of course, the sample is collected in an unbiased way, you would have studied about unbiased sample, random sampling process **right** from the register of electors or valuation list. Electoral roles or valid sources or you can look for other records like valuation list means it is a list of valuation of property or tax payers list, and so many sources are available and you can pick the sample based on the information available, and rows less. For our condition electoral roads are much better because they are updated frequently.

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A number of techniques are available for the home interview survey.

The full-interview technique involves interviewing, as many members of the household as possible and directly recording all the information.

In the home questionnaire technique, the interviewer collects only details of the household characteristics, leaving forms for household residents to complete with regard to travel information.

The completed forms are collected by interviewers after a day or two.



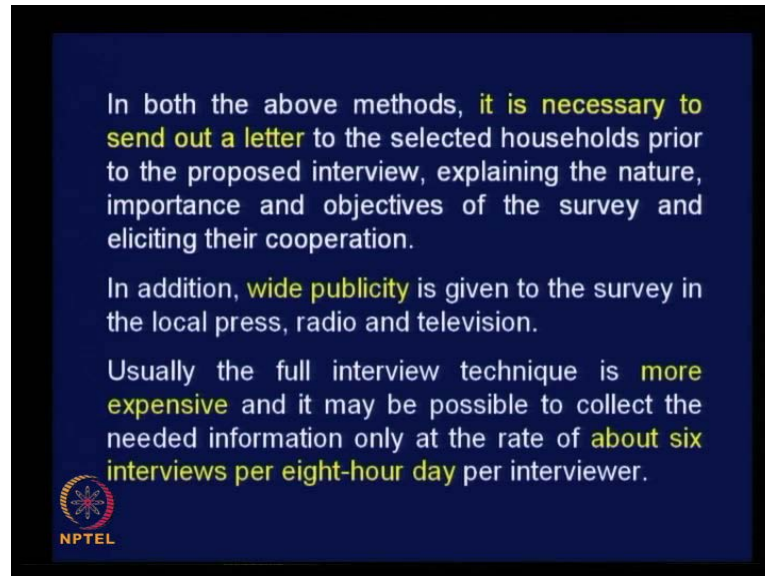
A number of techniques are available for home interview survey, one possibility is this. Full interview technique involving interview of as many members of the household as possible, and directly recording all the information, this is the household talk to each in the every member of the family, and collect whatever information you want.

And of course, you have to be careful you cannot ask all kind of questions, you have to be very careful and collect the information, whatever is required for your professional use. In the home questioner technique, the interviewer collects only details of the household characteristics, interviewer basis a household, and collects information about the characteristics of the household. What you understand the characteristics of the household?

Information related to social, and economic aspect; that alone is collected the advantage here is you can collect this information from even one of the members of the family. Is it not? You are going to ask about vehicle ownership, employment details, age, sex, etcetera. So, you can easily get the information even in if one member of the families available, is it not. And living forms for household residents to complete with regard to travel information, because each individual is making a number of trips in a day, and you leave form pertaining to that part with the household with the request to fill up the information, which will be **which will be** normally collected later by the interviewer

himself or herself after a day out **right**. The completed forms are collected by interviewers after a day or two **right**, that saves time for the interviews

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In both the above methods, it is necessary to send out a letter the selected households prior to the proposed interview, explaining the nature, importance and objectives of the survey and eliciting their cooperation; is the most important aspect.

You would had experience of population senses personal visiting or homes; there use to be a lot of advertisement about the on going senses operation, and even the dates fix for different zones within a city are also announced. And the residents are requested to a respond positively, when the senses personal approach for homes. How many of us have really taken it seriously in responded to the interviewers, all of us we should do that, and senses personal express difficulties, some of them are not taking it that seriously.

When that is the situation, even for a senses operation think of collection of data for transport system planning in a city, unless you do a good amount of advertising. Pass on the information to all concern, you will not be able to elicit the required information from the residents, you must tell them clearly, that it is to their advantage if correct information is provided to you, when you approach them. You have tell them it is going to provide ultimately a very good transportation system for them to use, and enjoy.

Somehow we should be able to convince the residents of the urban area, that this is a very important exercise, and they must spend some time to give this information. And, we need to send out letters indicating the date and time at which an interviewer will be knocking at the door of a particular household. Because you are an intruder, the surveyor will be the intruder the privacy, and we have to be very careful and send out letters in advance, and give publicity has to be given. This is what I said, in addition why publicity is given to the survey in the local press radio, and television.

I informed you about my involvement the transport system planning study for braunschweig city in Germany, in that city this particular aspect was followed systematically, they gave wide publicity in newspaper, television, and all other possible media of communication **right**. Understanding most cities of developed countries, even city mayors appear in television, and explain about importance of this kind of survey, and request the resident to provide accurate information when people approach them to get the information.

Mayors being elected representatives there will be some respect, and there will be implication by the residents provide the required information. Usually the full interview technique is more expensive, and it may be possible to collect the needing information only at the rate of about 6 interviews - 6 interviews per 8 hour day. We employ one interviewer will be able to get 8 hour what, 6 households in a day. Assume that you are entrusted with the work of conduct of home interview survey for a city, let us say the population of the city is 1 million.

If the average household size of the city is 4, then this will imply that a total of 250000 households will be in the urban area. To capture the wide variation in the socio economic characteristics of a country, let us say we consider a 10 percent sample size for household survey, then how many households are to be interviewed. We have to interview 25000 households - 25000 households is not a small number, and assuming that you are conducting a full interview household survey. Employing interviewers by paying say rupees 500 per day, what will be the total expenditure; the total expenditure will be 25 lacks of Indian rupees or 2.5 million rupees.

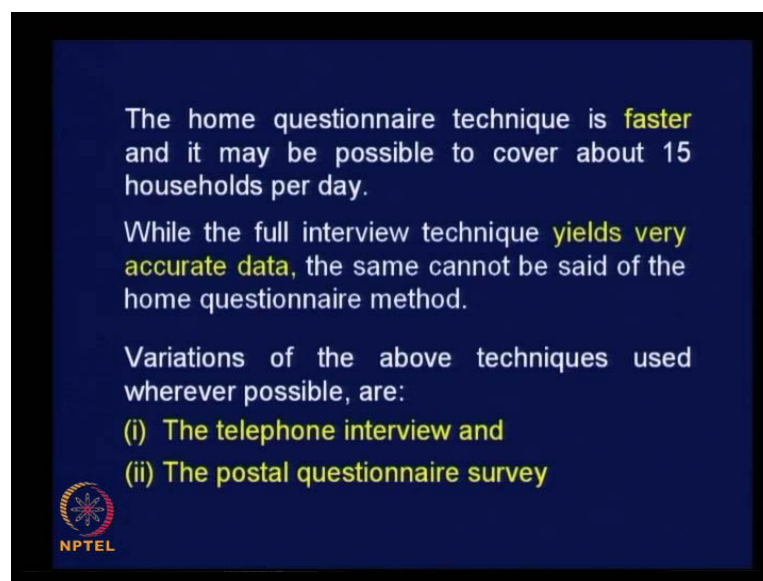
Normally, under Indian condition the expenditure related to household survey is about 50 percent of the total expenditure; this implies for this type of survey involving

comprehensive transportation system planning, if you estimate the total expenditure covering all work elements, the total cost is likely to be 5 million rupees, because the this expenditure implication this type of comprehensive system planning studies have not been conducted in many cities in our country.

This type of study has been conducted only in few selected large cities like Delhi, Kolkatta, Mumbai, Chennai, Hydrebad, Ahmedabad, Bangalore, etcetera; however, considering the amount of expenditure we spend in other projects, and considering the long term benefit of this kind of studies, it is worth spending this amount of money to cover at least all the cities with population of 1 million and above in our country.

Somehow this long term benefit is not understood by the decision makers, and that is how without proper planning base we try to solve the transportation problems of our cities, and towns by providing some peace wheel solution. We just construct flyovers, (()) roads to solve isolated traffic problems in our cities and towns; if there is a document available providing clear information about a demand for transportation on various traffic corridors, and the need for development of different types of transporting the transportation infrastructure. Then the overall transport system infrastructure development can be done in a systematic way.

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The home questionnaire technique is faster, and it may be possible to cover up about 15 household per day right, because only part of the data is collected and for the rest of the

data the form is handed over to be residents, and collective later. While the full interview technique is very accurate data, because you are talking to each and every individual, the same cannot be said of home questionnaire method **right**, its possible.

You are just leaving out a set of forms, and some may be filling up the forms seriously, some may not take that much of interest, so accuracy is questioned. Variations of the above techniques used, wherever possible or the telephone interview survey, and postal questionnaire survey instead of surveyors visiting the households. Think of sending the questionnaire to the selected households **right**, and fix up a time with the household members, and talk to them in telephone and elicit the answer for each of the items in the questionnaire, and record at the other end.

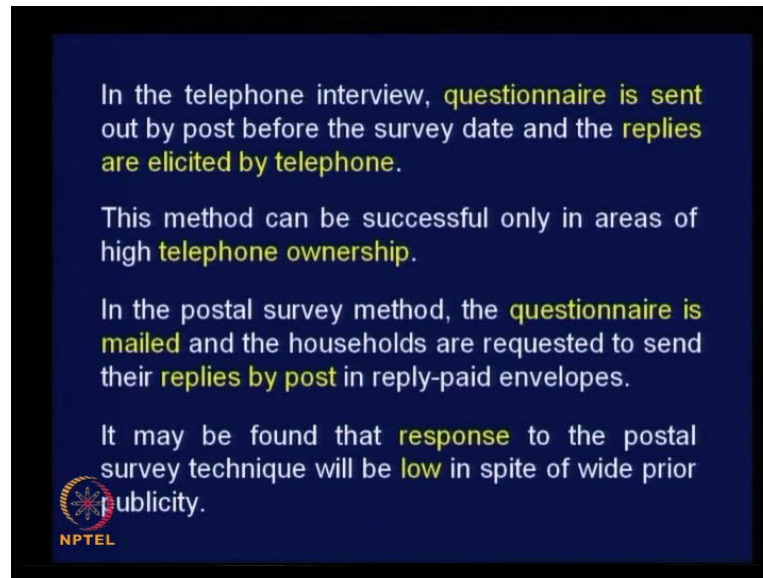
So, that way their privacy will not be disturbed, you are talking to them in telephone, they are answering your questions **right**. Another possibility is just post the question itself, and ask them to fill up on their own and post it back to you; after all you need to get information about the socioeconomic characteristics, and travel information. So, these are the other possibilities for our conditions.

Still the reason past I use to tell that telephone interview is not possible in India, because of poor telephone connectivity. Now, I withdraw that statement an every individual almost deciding telephone connectivity cell phone in their hands, whether it is a vegetable vendor or milk vendor, cobbler on the road side everybody is having cell phone connectivity. So, getting people connected to a central location is not going to be that difficult, you have a point **yeah** please.

Sir, any developed countries going ahead with internet surveys, because giving a small financial incentive **incentive**, and asking people to respond on the minute would be a reasonably good idea.

Yeah, it is a good idea. So, for I think I am not come across any literature giving information on this particular aspect. Still a most countries are doing with postal questioner survey, because they record the information, they want to have authenticated information. So, that is why they depend mostly on postal questionnaire survey even for Braunschweig city, it was a postal questionnaire survey.

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In the telephone interview, questionnaire is sent out by post before the survey date and the replies are elicited by telephone.

This method can be successful only in areas of high telephone ownership.

In the postal survey method, the questionnaire is mailed and the households are requested to send their replies by post in reply-paid envelopes.

It may be found that response to the postal survey technique will be low in spite of wide prior publicity.

 NPTEL

In the telephone interview, questionnaire is sent out by post before **before** the survey date and the replies are elicited by telephone. This method can be successful only in areas of high telephone ownership **(())**, obvious this statement is irrelevant as of now. And in the postal survey method, the questionnaire is mail, and the households are requested to send their replies by post in replied paid envelope obviously. You pay for the return post also, and the returns are likely to be poor in postal questionnaire survey. What extent it is likely to be poor, we should know that you send out hundred questionnaire, how many might come back to you.

You must have some idea about it based on which you can decide the number of questionnaire to be sent with reference to your sample size, your sample size is 5, then you send the questionnaire equivalent to double the size, if we expect only 50 percent in written. In fact, in braunschweig city the percentage written was 46 percent.

People are busy. So, you should send out more questionnaire. So, that you get at least the expected number back, it may be found that responds to the postal survey technique will be low as I said in spite of wide prior publicity **right**. So, we will stop here, and to summarize what we discussed toady, we extended our discussion related to previous class to understand how division of the urban area into sectors, and zones are done for a particular case, namely Tiruchirappalli city. Then we listed the different types of surveys that are normally conducted to collect information on the four different types of trips or

movements namely internal to internal, external to external, external to internal, and internal to external. In the list we first took up the home interview survey, and discuss in detail the methodology of conducting home interview survey, and now we know there are different methods that can be followed for conducting home interview survey.

Obviously, even today for Indian condition it is not possible to going for either telephone interview or postal type of survey, because of the high level of illiteracy prevailing in our country, even today. The only recommended procedure for our country as of now is actual interview - home interview survey may be after a decade or so, we can think of the other methodologies. With this we will stop, and proceed for continue with the rest of it in the next class.