Sustainable Transportation Systems
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Lecture 31
Sustainable Transport Planning and Approaches II
The Contemporary Planning Process

Hello friends, in the series of sustainable transportation planning, so different approaches we are discussing. So in the comparison of last lecture today we will discuss about contemporary planning process. So the induced planning process which we discussed last time.

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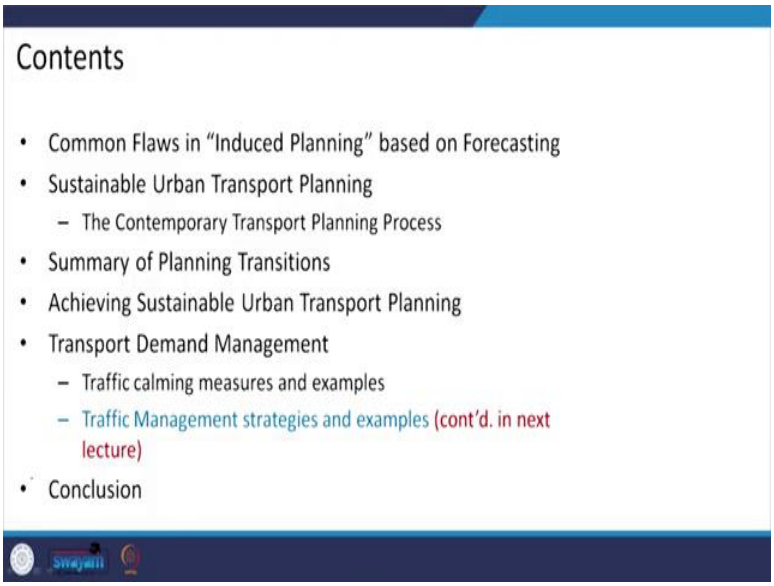

So the common flows in that particular planning approach we will discuss initially. That is induced planning based on forecasting of demands and then the supplying of the infrastructure to meet those demands. After that we will see sustainable urban transportation planning on the basis of contemporary transport planning process approach, and the summary of planning transitions of different transitions from different transport modes that we will see, and then how to achieved the sustainable urban transport planning, those particular principles we will discuss again.

Then transport demand management, how to meet those traffic calming measures and examples of those, reducing the speed of the traffic, calming down the traffic and the traffic management as a whole different strategies and examples that we will see in the next lecture. So today we will

conclude about those different measures which are used for basically traffic calming, after this discussing the approach, which is related to contemporary transport planning process.

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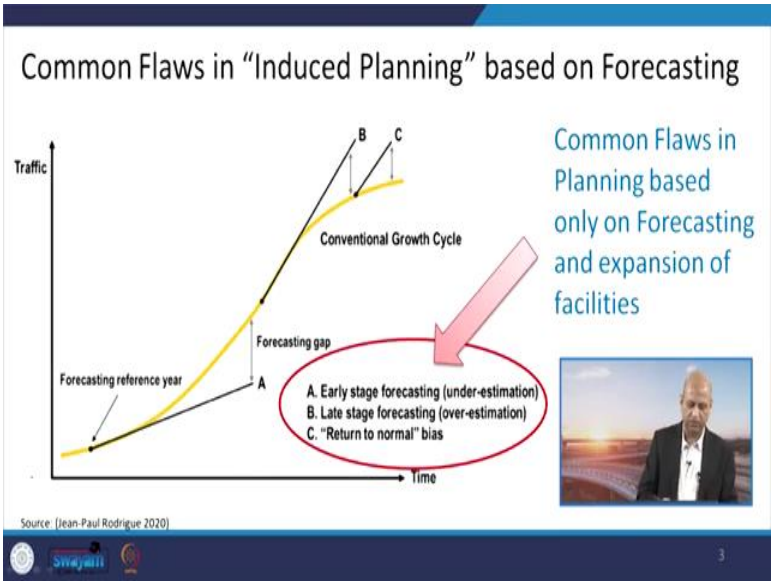

Well so you can see here, this particular graph shows the traffic and the time. So for example if we do some forecasting planning, so it goes like linear on the basis of some demand, some model, so this A point is forecasted point, but in reality it will go to this point. So this is the forecasting gap. That means it is early stage forecasting is underestimating. So those kind of things may happen, this is just an example. Overestimating or underestimating can happen.

In future, for long term, when we go for taking those particular relationships or equations, which gives us to meet the demands in certain manner, so that may be kind of overestimation and the real demand after certain years maybe less in comparison to the projected or forecasted demand. So that way there will be gap and a lot of investment may happen there, or maybe wasteful or maybe required, depending upon whether it is overestimated or underestimated forecast.

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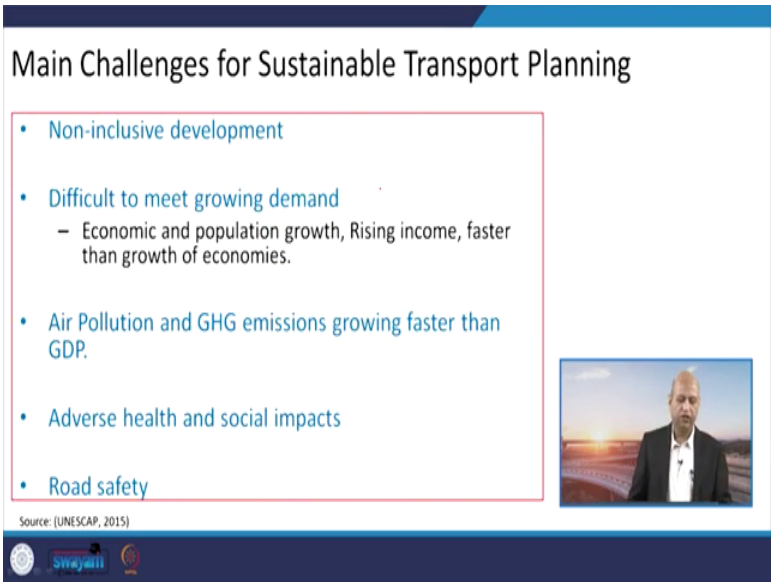

Well the challenges which are, to address for sustainable transportation planning, like the non-inclusive development, because when we are just meeting certain demands and the infrastructure related requirements without giving much attention to the changes in the population segments and their needs, so it can be like over the years non-inclusive means, it may not address these requirements or the needs of the all segments of the population, so that maybe one issue.

Then it is also that this population growth, rising income faster than growth of the economies, so they all create some sort of gap, within that particular transportation model. So there is another rationality which is related to air pollution or greenhouse gas emissions which grow faster than the growth of the GDP, then adverse health and social impacts and the road safety issues.

Means there is no holistic approach. These things are kind of neglected in that particular, very straight way of planning the transportation systems, based on the demand and projection kind of, induced demand kind of model.

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So when we see like one example as U.K. Transport Planning Society. So they say that we should prepare, assess and implement the policies and plans of the projects. So these should be addressed in that particular planning process. It should improve and manage this transport system efficiently. Means it should not be like it is in-efficient in the sense of some environmental degradation or cost related parameter.

Then the planning should be like from local to regional to the national level, integration must be happening. It should not be in isolated way that you are just meeting a particular cities or particular community's demand and you are just out of sync of the other requirements which are of greater eco-system you can say.

Then we need to understand the interrelationship between the transport and the infrastructure and the future shapes of the cities and towns which may take place in different ways depending upon the requirements. Let me give you one example. Like Kota city in Rajasthan, that was having earlier several industries but later on it grew like an education hub.

So service sector grew without any warning and to meet those kind of transportation or mobility related needs maybe 10-20 years before that particular hub was increased in that sense. It was not imagined. So that way cities can take place, shape of different kinds and different nature and they can challenge through different kind of demands and needs.

Well then it should change people's perspectives and attitudes towards the transportation and it should encourage the alternative modes of the travel rather than privately owned vehicles. Means community based system must grow in the form of like shared transport mode, in terms of like some buses or city buses or railways or other public transportation systems.

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Well, so as we have always seen these three or four components which are interrelated to each other when we talk about sustainable urban transportation planning, so the economic, so when economy and the ecology they intersect then the conservation things come in to place, means economy should not grow in that sense that it destroy the eco-system or the environmental. It should grow with the conservation of the eco-system.

When economy intersects with the society, so it should contribute to the welfare of the society rather than harming one group vis-a-vis another group, when we talk about intersection of ecological existence and the society or social, so this is ecologism. Like these kind of terminology is there. That means the society also grow in an eco-centric development way. Means we should not be away from the eco-system as a whole, rather we should be part of that whole system. So, holistic or integrated approach is very much required to achieve the sustainable transport planning.

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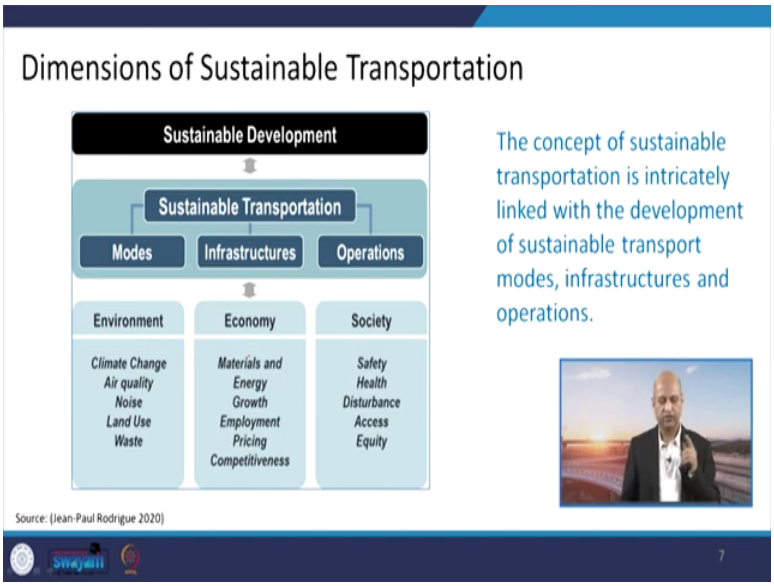

So in the planning process we need to take in to account all these particular important aspects. Well when we talk about different dimensions, so as a whole, like modes, transport modes or infrastructures and operations, so all these three components as have discussed several times that environmental climate change or the air quality, noise, land use and waste related things must be addressed properly so that environmental degradation can be avoided altogether.

And the economy means the materialistic need should be fulfilled in that way, so that the employment grows, most of the people it should be inclusive growth rather than segregation kind of a thing and the energy and exploitation should not harm the environment and should meet the demands of the people. Also at that same time protecting the environment.

Also when we discuss the social aspects then the safety issues or concession free and the access related issues or equity against those inclusive things, those must be incorporated properly otherwise you will see that certain localities are growing and they are supporting only a particular economic group and the other economic groups are deprived of those kind of facilities. So that is not the inclusive growth, that is not addressing equity related requirements of the society.

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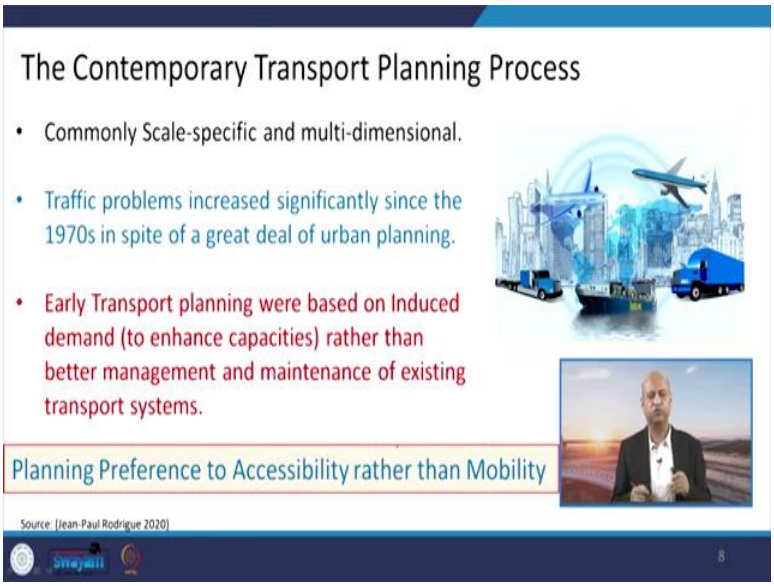

Well the contemporary transport planning process which today we are emphasizing on is basically with reference to the accessibility rather than the mobility. So earlier induced planning based on the demand, just if more cars are there, so let us have more roads or wide or those kind of things, but again more cars come and concession happens.

So that kind of mobility related, mobility centric growth is not always good. Only the accessibility, means every person should access that particular infrastructure and that is only possible when we do it in an integrated way, without leaving any segment apart from the growth trajectory.

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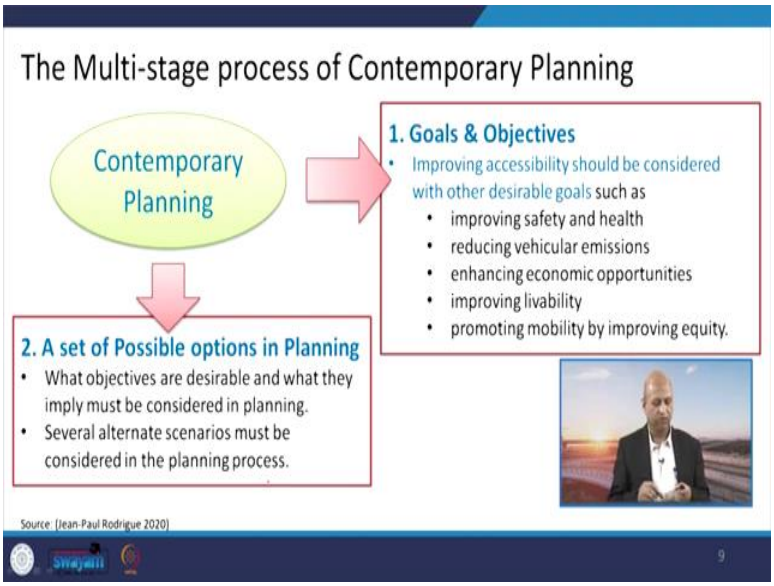

Well, so contemporary planning, it sets possible options like what are the objectives and desirable goals and aims and then the alternative scenarios. This is one aspect, before that goals and objectives must be like to improve the safety and the health related aspects or enhancing economic opportunities, improving livability of the cities and promoting mobility by improving equity so that all people can get access to those particular infrastructure of the transport.

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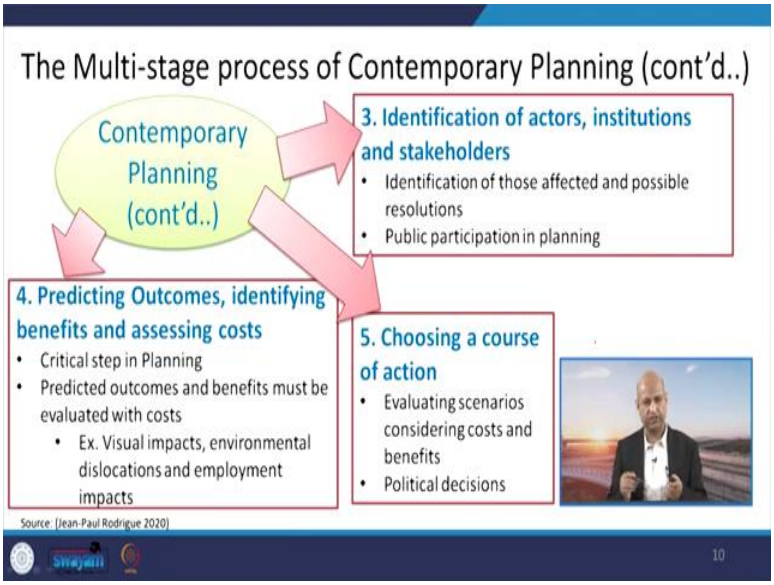

Identification of different actors and institutions, so for that also we need to encourage the public participation or even private participation, public private partnerships should be encouraged and then the outcomes can be predicted or those critical steps in planning can be taken care of, like visual impacts, environmental dislocations or employment impacts, all these aspects must be properly surveyed and taken in to account.

Then evaluating scenarios means what is the course of action which we need in this particular way of planning, so that course of action must be evaluated properly based on different scenarios. So that can also include the cost benefit analysis. That is very important. You are investing a lot of money in the infrastructure and benefit does not percolate or distribute across the social segment, different groups or all the communities, then it is not good, that is not very much beneficial.

So, that cost benefit analysis must be taken care of based on the community's benefits. Then political decisions also are important because certain groups when they are demanding their some particular demands which are over the years maybe neglected, so those decisions should also address the needs of the people.

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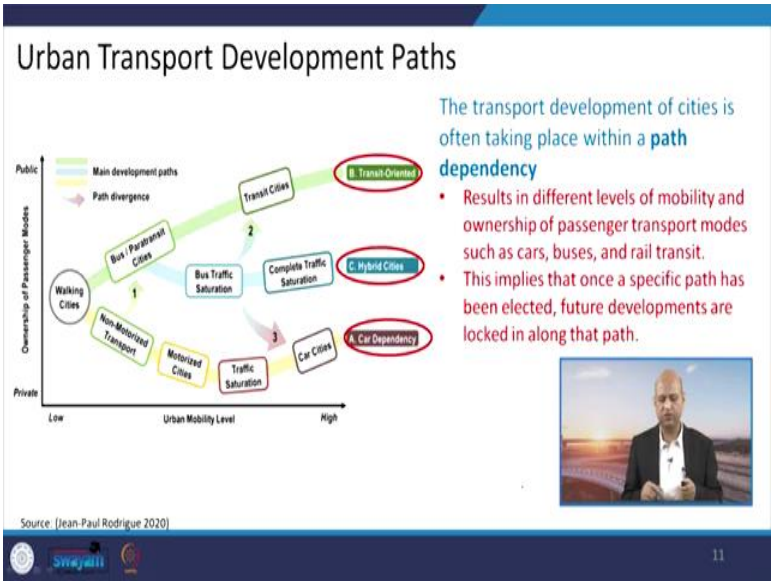

Well, when we talk about these different kind of growth system, like urban mobility level and the ownership of passenger, these modes. So you can see the walking cities' growth can be like non-

motorized transport and then motorized cities, traffic saturation, car cities that kind of car dependency occurs in a particular city.

So mobility increased but the ownership of the passengers in terms of the public transportation system decreases, you see this trajectory kind of a thing, but if you go for that transit oriented or maybe hybrid approach then the participation of the public transport system becomes higher and higher over the years. So that is very important aspect.

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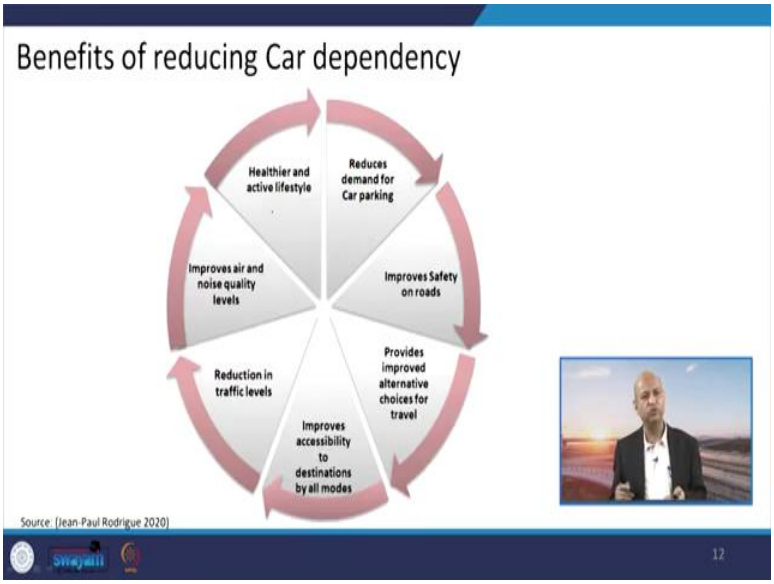

And also when we see like, because, let us assume if there are four cars, which are taking one or two people in each car, so that can easily be accommodated in a city bus, a small mini bus or so, or maybe if there is a bus of 30 passengers or 40 passengers that means it can meet the demands of let us say 20 cars. So the space occupied by the 20 cars is going to create some congestion, if we are having dependency on the cars.

So the benefits of reducing the car dependency are manifold, like reducing demand for the car parking which also need the space and then improving the safety on roads, more cars, more vehicles, more chances of accidents or congestion, those kind of things. Providing improved alternative choices for travel, when we are not only focusing on car but also giving opportunity to other alternate modes of the transport then we are giving them proper opportunity as a public transportation system.

Then improving accessibility because car ownership cannot be for all the communities or all the people, only people who are having good money, they can afford to buy the car. So accessibility issue is there. So if we make the cities less dependent on cars that means we are also increasing accessibility of the population to the mobility related infrastructure or transportation system.

Reducing traffic levels or traffic jams, congestion, improving air, noise quality, it is very simple, because more fuel is burned in more number of cars. So if we are reducing the car dependency, moving towards public transportation system, less fuel, burning less emissions, improved air quality, very simple relationship, and then because of that healthier and active lifestyle.

Because when we are dependent on public transportation system or transit system like buses or trains, then a lot of non-motorized transportation system also grow, like cycling, cycle rickshaw or other non-motorized, as well as motorized but less polluting vehicles like battery operated rickshaw, those kind of things also increase to meet that gap.

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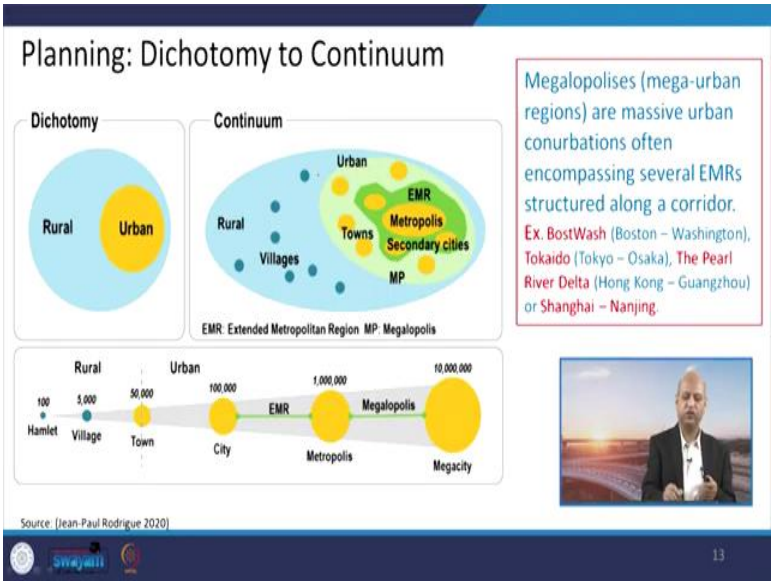

Well the dichotomy to continuum, mean earlier when we were focusing only on the induced base demands policy, then there was a great divide between urban and rural populations, needs about the mobility or transport. So that was the dichotomy kind of a thing. Means rural and urban are not synced in to one, but they are like urban transportation system is there, but rural population is deprived of those kind of transportation mobility.

So when we go for continuum, means integrating the rural people population, to the urban amenities then you can see like small towns grow around the big cities and there is a smooth transition, so the continuum. This is, the urbanization is in a continuum form, rather than in a pocket form, isolated form.

So initial hamlets converted like villages, then towns, cities, metropolis, then mega cities, those kind of things. Over the years it has grown because of engineering, science, technology all these issues has favored us to live together in big cities, as this carbon economy favors that kind of highly populated and highly dense, pack cities.

So if we go for those kind of transportation modes, which also provides mobility to nearby towns or nearby villages, that is why this Pradhan Mantri Gram Sadak Yojna has been so popular in India, because that has given great connectivity to rural population to the towns, nearby towns so that they can go and sell their produce and come again to the villages. That means there is no need of migration from village or rural areas to the city level.

So if we really improve this transportation system, which is inclusive, which is contemporary planning in a holistic way or a systematic way then it also meets the demands of the rural or suburban areas, those kind of things, and the pressure or the load on cities decreases, so that is very important thing.

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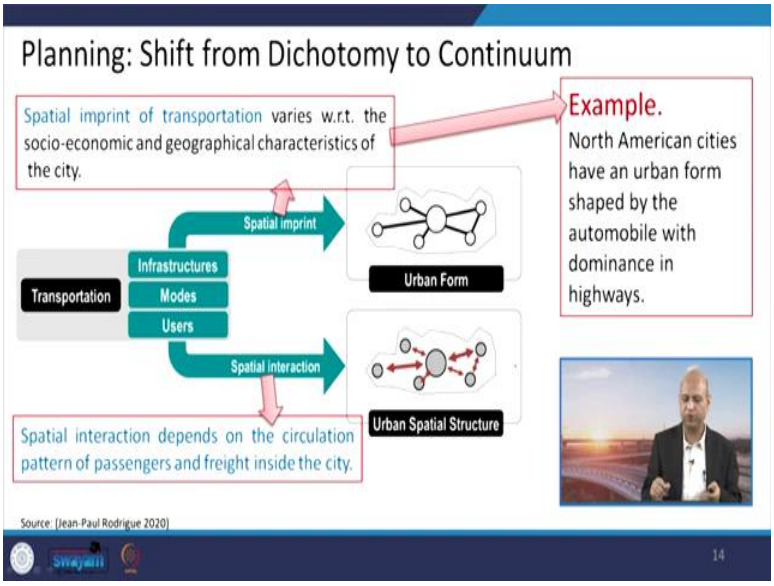

You can see here the shift from dichotomy; the continuum has helped, because it can meet the transportation needs of the nearby countryside population. So that is very important.

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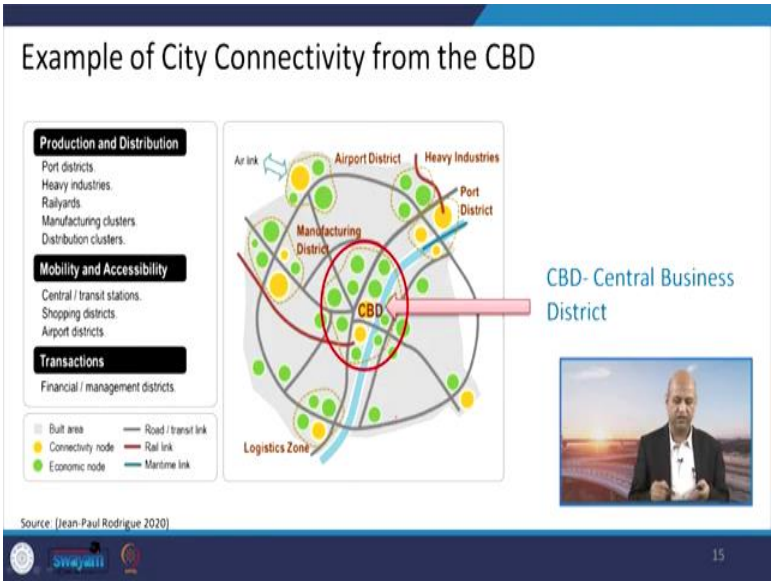

Well, here also again, these examples of products and distribution and so you can see this central business district or city center, so some those earlier designs of the transportation systems were focused only to the mobility to the city center. So other pockets were deprived of those particular demands or commercial needs, but if we increase different centers of the shopping centers or commercial centers in and around those city centers, then the needs become fulfilled at those particular locations.

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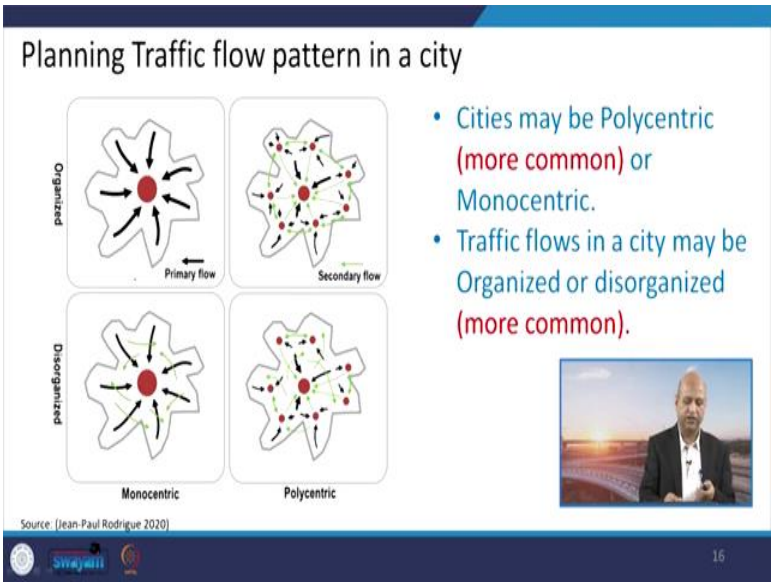

So this particular kind of growth development should be discouraged rather and these kind of things should be encouraged which is polycentric, means at various places you can have commercial centers or where population can, people can go and meet their day to day demand rather than going every time to the city center or something, those places.

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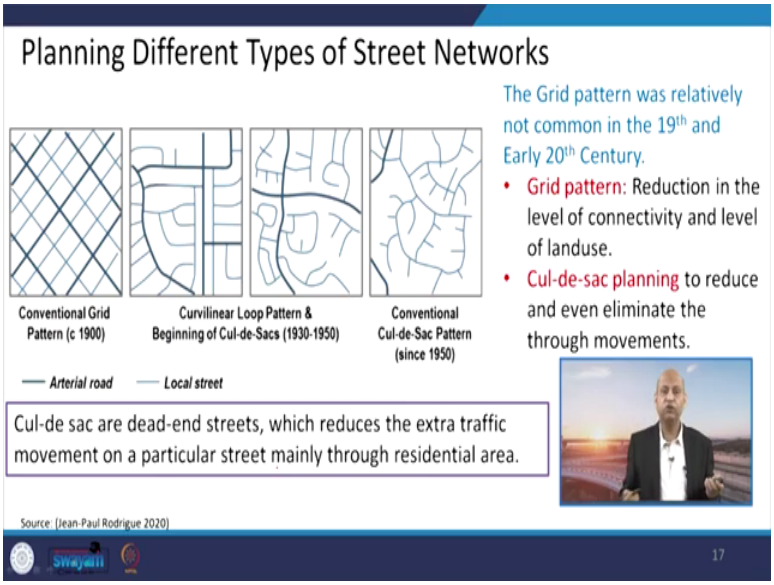

When we talk about different types of street networks so these kind of figures emerges like conventional grid pattern where street, roads intersecting each other and there are areal roads and

local streets, et cetera. Then there are these curvy linear loop patterns, those kind of things also happen to meet the demand.

So these are through way, means one road can take you from this point to that point. But in this particular pattern there are no through movements, means there are checking it and reducing the extra traffic movements on a particular location, so that way it can discourage those kind of long range transportation.

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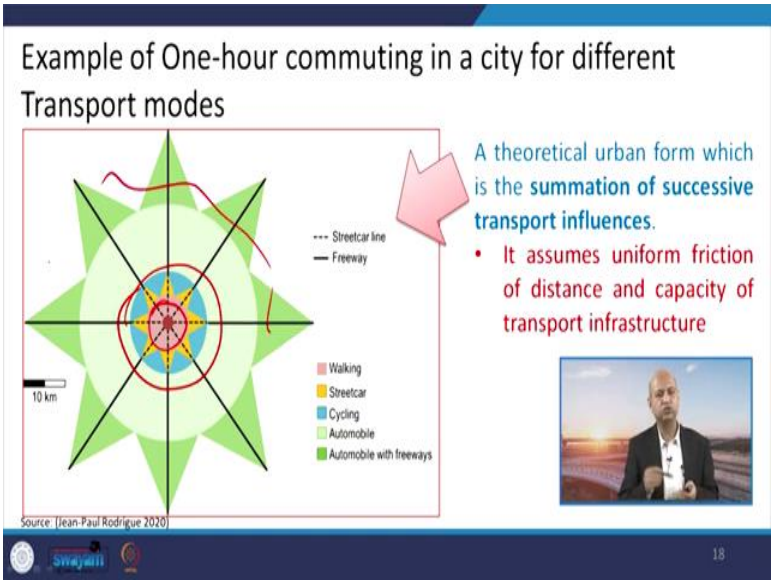

Well when we talk about this very imaginative and theoretical concept of urban form in the summation of successive transport influences you can see like this particular city center can be dependent upon only walking, and then circling this can be like a street car and then particular region can be met or catered by cycling, and then these automobile freeways etc. So those kind of growth can also be integrated properly so that traffic calming can be achieved.

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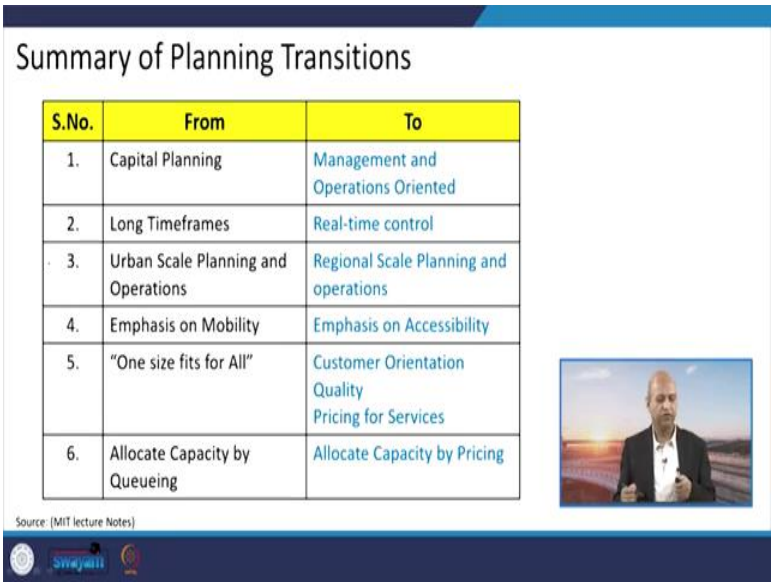

When we talk about summary of this planning transitions from like capital intensive planning which was the induced forecast based planning, it has shifted towards management and operation oriented planning, more cohesive kind of thing. Long timeframes because of this forecasting that this will be the growth let us invest a lot of money and have the infrastructure.

Now it is real-time control, because it includes various kinds of vehicle categories, various kinds of transport modes. So it talks about holistic and integrated approach rather than the isolated or only single type of mode. Then urban scale planning and operation, it is region skill planning as we have seen. It also include the countryside populations, demands and emphasis on mobility only, because when traffic congestion is there let us widen the road.

That is not meeting the demands; after 2-3 years, again more population of the vehicle is there and again congestion occurs. So rather than mobility accessibility is more important. So that people do not need to come to a particular place. They can meet their demands in a local area, those kind of accessibility points are to be taken care of.

Then one size fits for all, those kind of systems were there, but here now people talk about like customer orientation in a particular location if a particular kind of transport mode is needed let us promote that and then we can link it with other kind of transport mode. Then allocate capacity by

queuing means this project will come, then next project will come, here it is capacity by pricing, means affordability and also which can be doable kind of thing.

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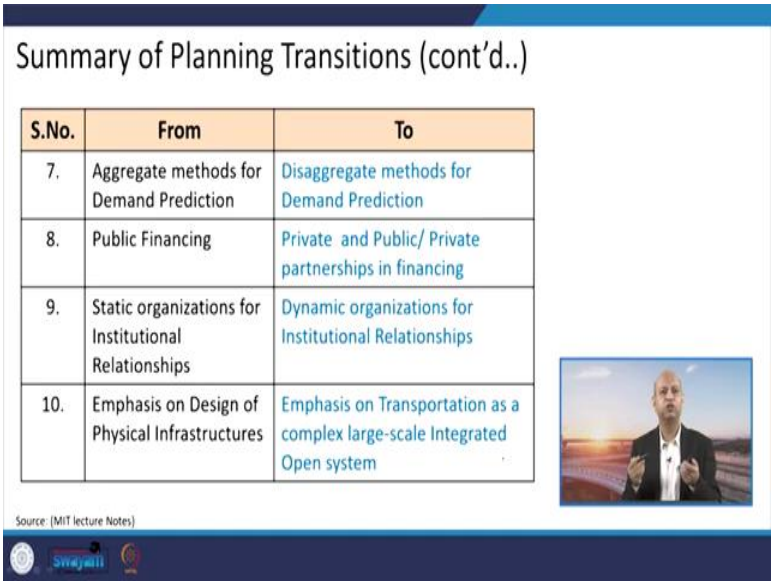

Next is like aggregate methods for demands prediction, this is disaggregate method because it talks about many components. Public financing, now we are talking about private public partnership, so that more resources are available to promote or strengthen the infrastructure system. Then static organization for institutional relationship, one particular organization has been created like let us say PWD that will take only the roads, kind of thing.

Here there are many other organizations which are coming into picture, now toll roads are there which are being managed by private entities. So those kind of things means it is not necessary that only one government owned particular organization will operate and manage every kind of affair. This can be distributed more effectively and in an optimum way.

Then emphasis on design of physical infrastructure only; like roads or railway tracks, only those. And we are not talking about local to regional to those national level grid system. So this is not emphasizing on complex large scale integrated open system. That is why we talk now of these inline waterways also. We want to shift the load from the railway networks, from the cargo to the inline waterways or from the highways.

So those kind of integration is happening at the national level. That is a wonderful example of this sustainable transportation system. So that we can reduce a lot of load from the highways and we can shift to those very environment friendly inline waterways.

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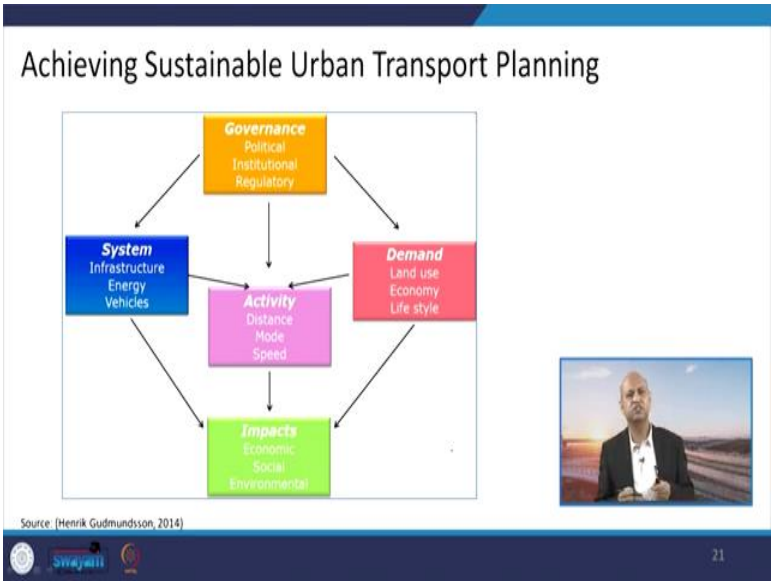

When we talk about achieving sustainable urban transportation planning, then we talk about these particular components like governance, then demand, these activities met by the systemic approach and the impacts on economic or social environmental.

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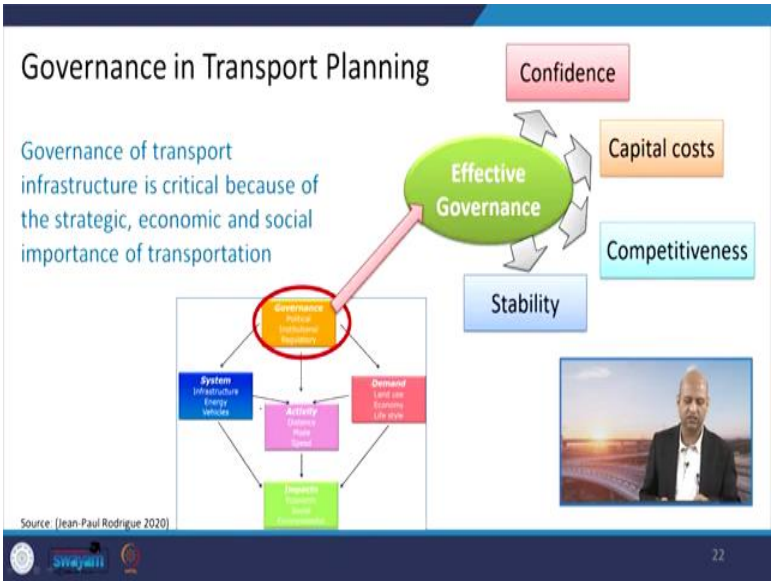

So those things we can see in detail here. Like governance aspects, they basically should be effective governance. As many times we hear about that the government should be less governance should be more, thin government expanded governance systems. So confidence in the public must be increasing towards the governance system.

Capital cost should be available, competitiveness should be, healthy competitiveness should increase and the stability in the sense of some system so that it is not unstable that only for certain years it is meeting demand, after that it is ineffective or unstable that should not happen.

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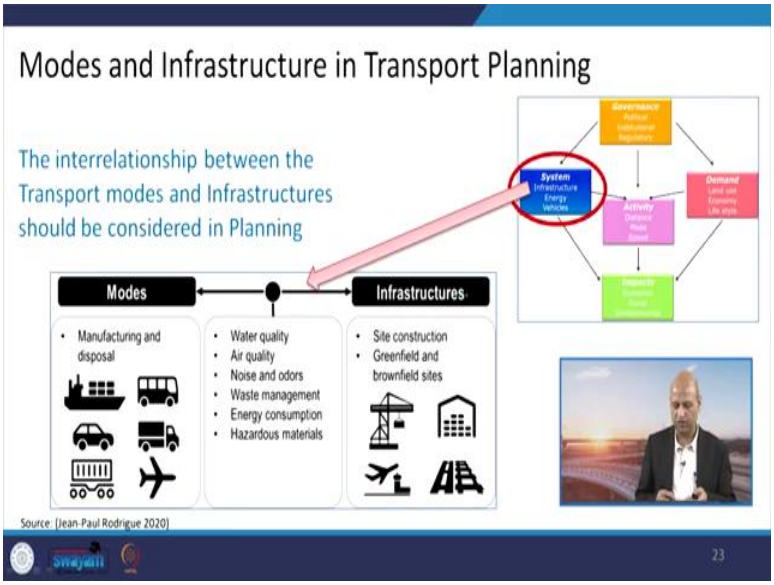

When we talk about systemic approach, then we talk about all kind of modes so you can see these cargo ships or air or car, road, train, everything. Similarly infrastructure related and environmental aspects, all these aspects which we have already discussed at several times, then the side construction, green field or brown field sides development, all these things is taken care of.

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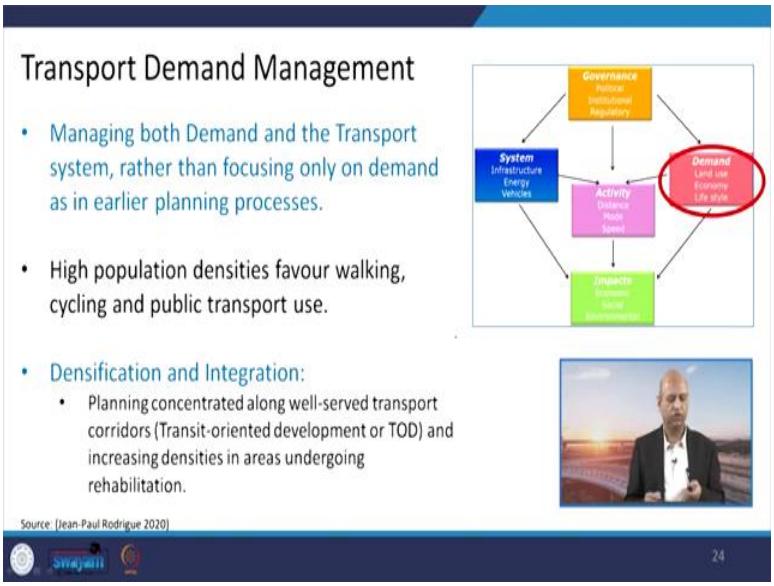

When we talk about transport demand in terms of high population densities favor walking, means what kind of population segment is there. So if high rise buildings are there, better we should encourage working cycling, et cetera and then connecting them to some public transportation system. Otherwise what will happen?

In that particular location there will be so much traffic or two wheelers, three wheelers or four wheelers privately owned I am talking about, and it will be congestion, it will be unhealthy thing. So according to the population we should meet the demand.

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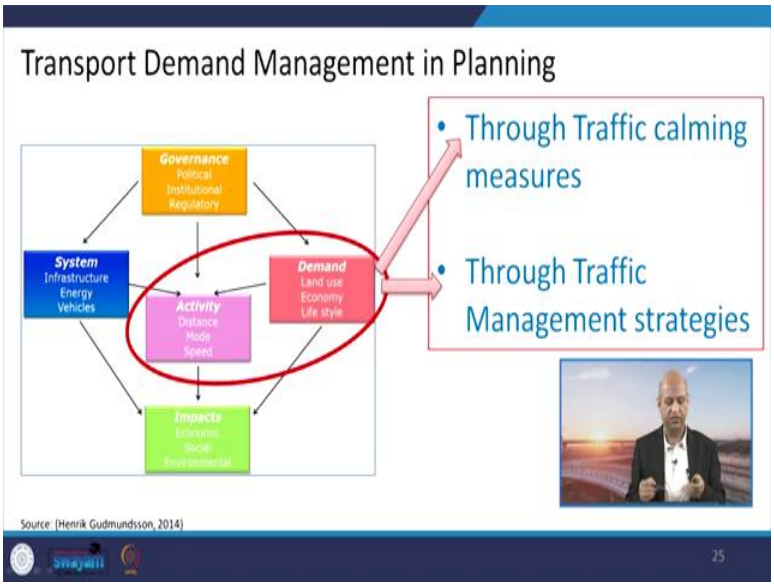

And through traffic calming measures means different kind of calming measures like we will see like bumps or humps, those kind of things and other modern kind of structures that can be taken care of for managing the activity in a proper way.

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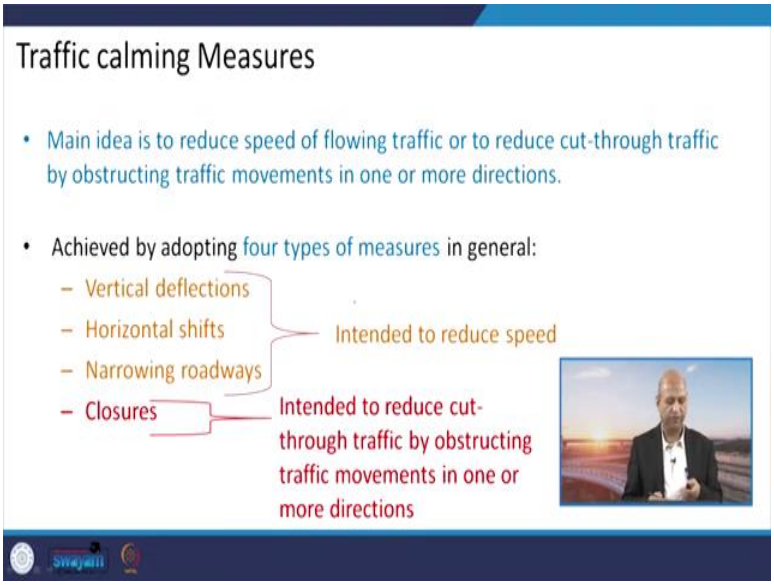

So now we talk about traffic calming measures. What are those traffic calming measures which can be used, those are kind of cost effective, very simple to create and to change the behavior,

this behavior of the drivers to reduce the speeds of the vehicle. So the vertical deflections can be there or the horizontal shifts, then narrowing the roadways or the closures at certain place.

So that people do not just use the through way, rather they go taking a longer route and that way the traffic can be diverted and the calming conditions can be achieved at particular locations where it is much required like near hospitals, near schools, near parks, those kind of things.

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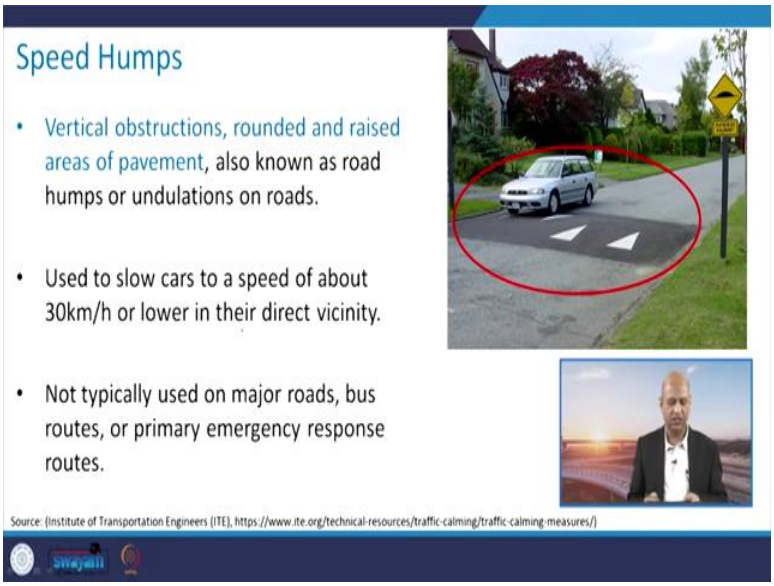

So these are like speed humps where a quite wide location is taken and then it increased the height so that traffic slows down and then it goes beyond this particular location.

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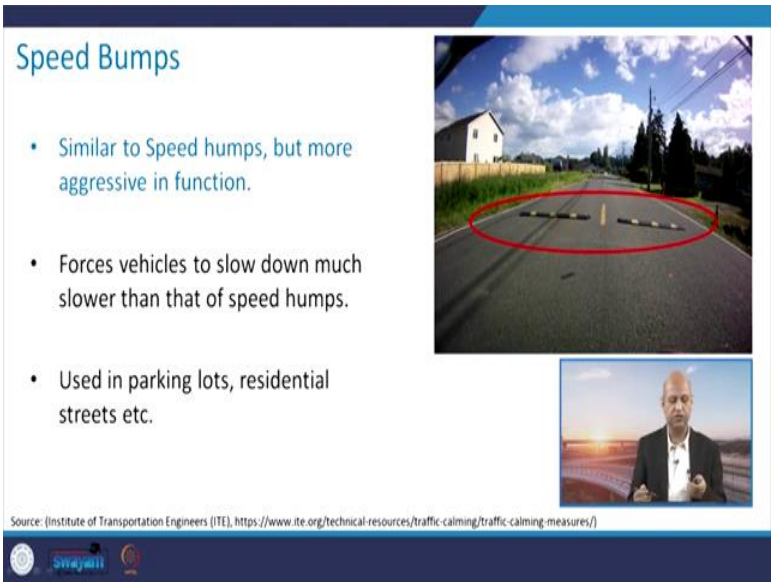

There may be some speed bumps which are narrower in size, but the height is again same, so it will give kind of "Hud" kind of a noise and the drivers will be having tendency to reduce their speeds quite significantly.

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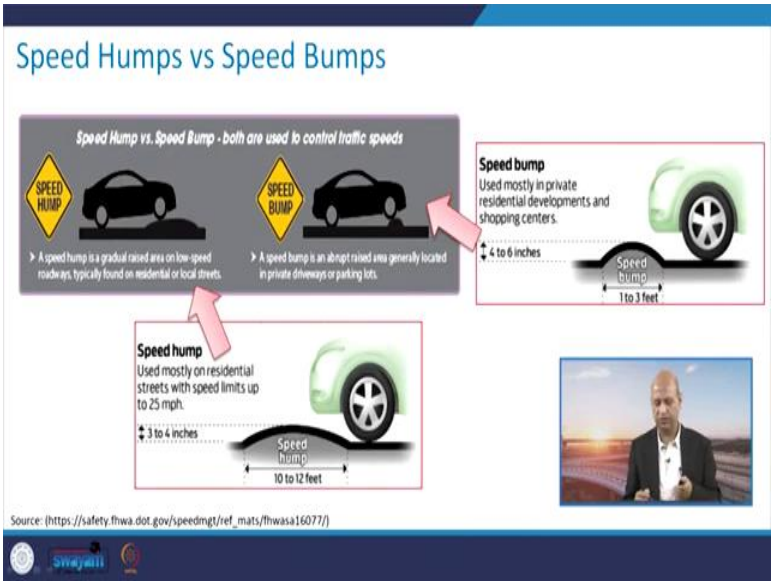

So here it is the difference between speed bump and the speed hump is shown properly, 10 to 12 feet wide and then this height, 3 to 4 inches height. Here it is 4 to 6 inches height, more than the

hump, this bump and 1 to 3 feet only narrow, so this is very, kind of it will really, if you do not apply the brake then you will jump and you will have a very bad experience, you will feel jerks.

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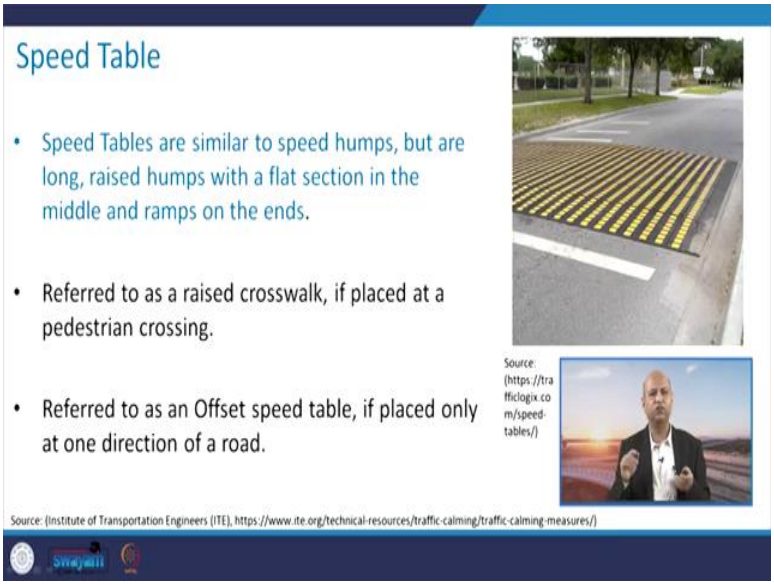

Then there are some speed tables kind of things, which are not of that height but they have such material or those structures which will give you continuous jerk and you will have tendency to apply the brake and reduce the speed.

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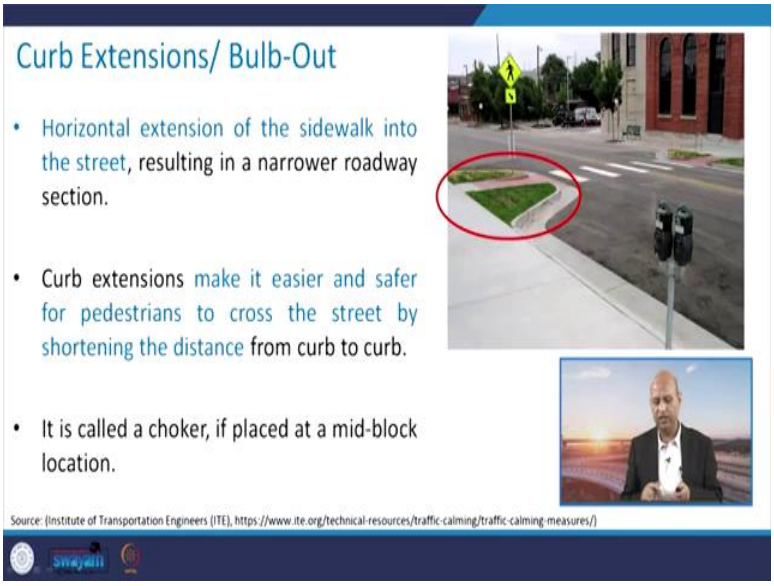

Well there are other ways like curb extensions or bulbing out so that way again for helping the pedestrians, etc., it can be used and that also removes some space from the main road and the speed is reduced by that particular structure.

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So you can see here, here it can be used for pole also or maybe some benches can be applied if it is needed for old people and so. So a lot of space can be used that way. So these are the ways of the curve extensions, where the narrowing down this street and that way the space can be used more fruitfully.

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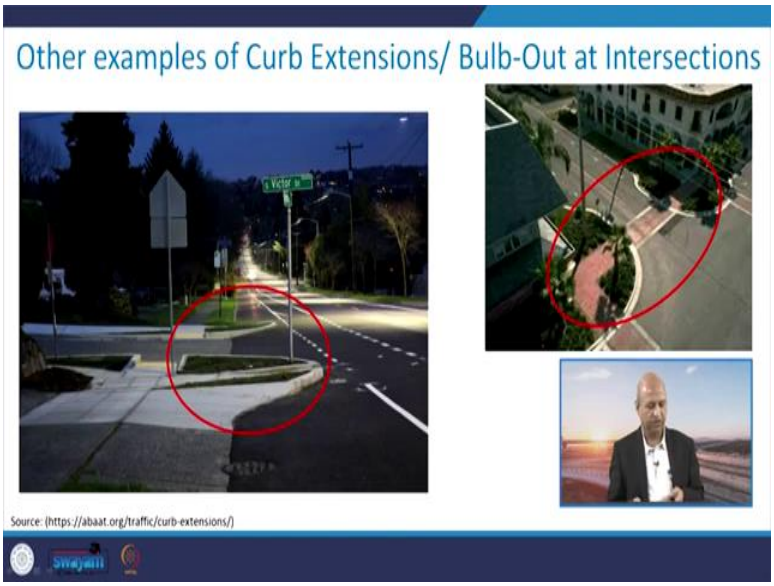

Well these are other examples of curb extensions. So again here very little space is available, so that speed will be not so much and this can be for pedestrians, etc., so that way also these are the spaces which can be used from the main road. So it is narrowing down so here the speed will be automatically reduced and these will be used for other purposes.

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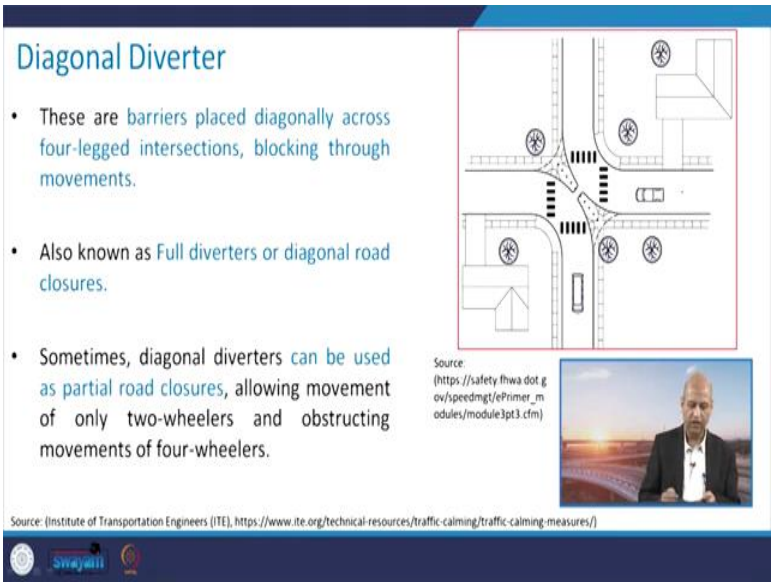

These are diagonal diverters which can be used for reducing through way so the people will have this kind of movement, rather than coming across this way. So they will come through other

turning points and they will not come directly. So that way again the calming can be achieved, means less traffic will be there at this particular junction.

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Similarly you can have some full road closure so that it is just closed and people will not go directly. They will go to some other longer route and it will be the place available for kind of other activities, pedestrians, cyclists, etc.

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Similarly you can have from the main road you can have this space for this cycle track, et cetera. So the partial road closure using diagonal diverters can be again used for traffic calming, that means reducing the speed of the traffic and encouraging the pedestrians and cyclist movement.

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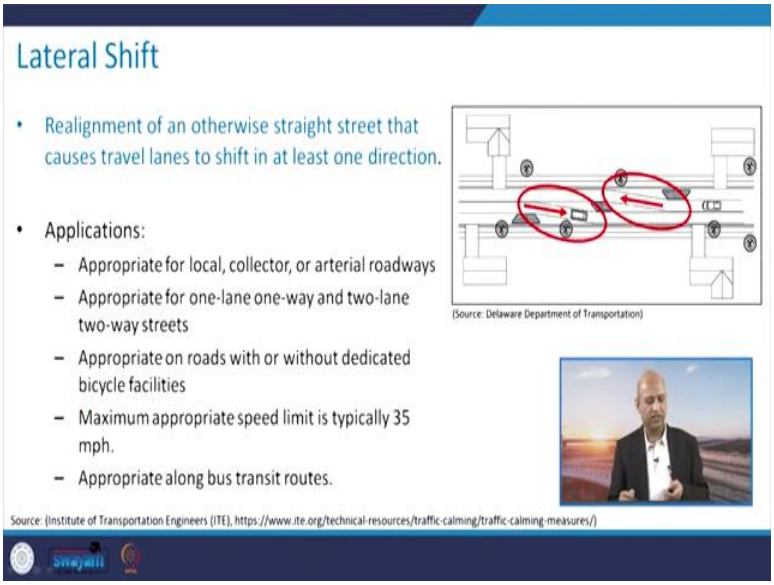

Then there are lateral shifts. So going towards left or right, so those kind of diagonal shifting may be there, that can also reduce the speed of the vehicle.

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Similarly, these are again the examples of lateral shifts, so again you can see the narrowing down at certain places where people will apply brake and these are the practical examples of lateral shifts, where people can transit from one lane to another.

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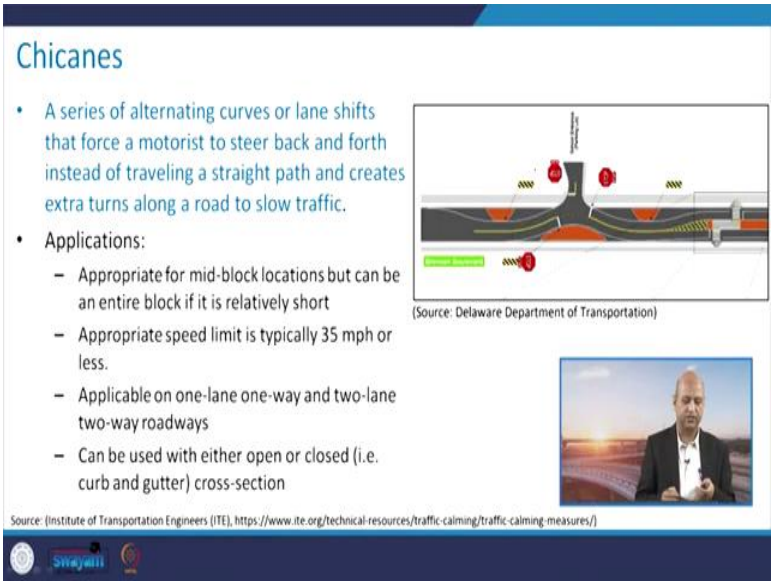

So in that way, then there are structures which are known as chicanes which are nothing but a series or alternating curves or lane shifts, so that when you are going in a zig-zag way then you have to apply the brake, you cannot just go through way. So those kind of structures can be there like this. So that will help again to reduce the traffic speed.

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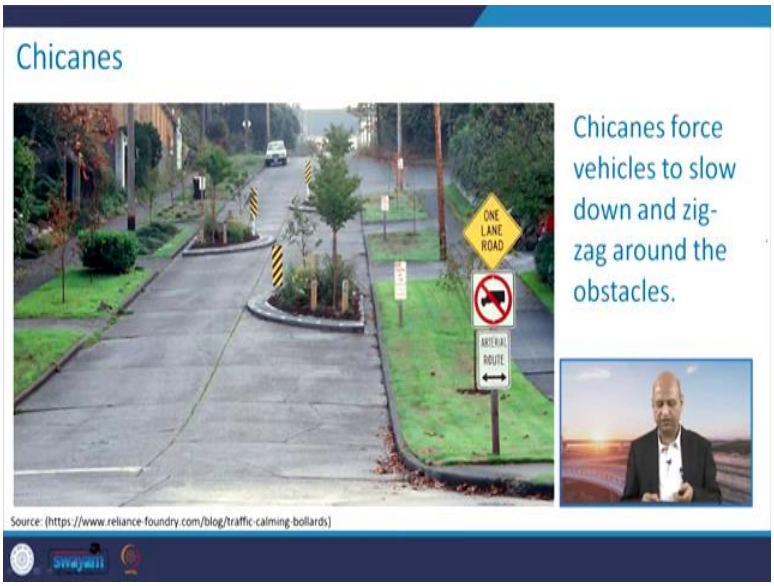

And these are like you can see, here this place like this. So that way you will not have just cross way and you have to apply brakes.

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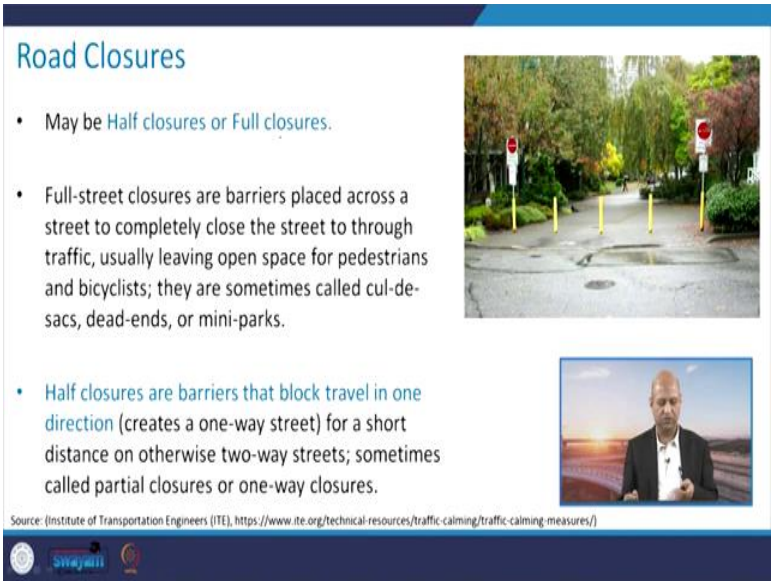

These are again some road closures, full-fledged, so that only pedestrians or cyclists can be allowed but not the cars, et cetera.

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Similarly this half road closure so it is closed halfway so only one half road is available, so again the narrow space is available so you will have to apply the brakes.

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Then full road closure again, another example where only the traffic cannot come from that way or it cannot go that way. This has to go this way and take the longer route and this may be a local community where more calming is required.

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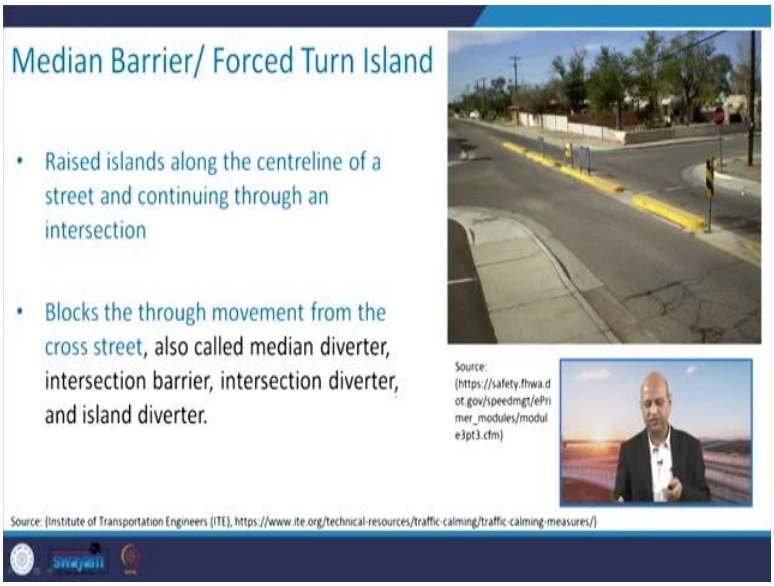

The median barriers or forced turn up islands, so the height can be increased and those turning kind of structures can be used.

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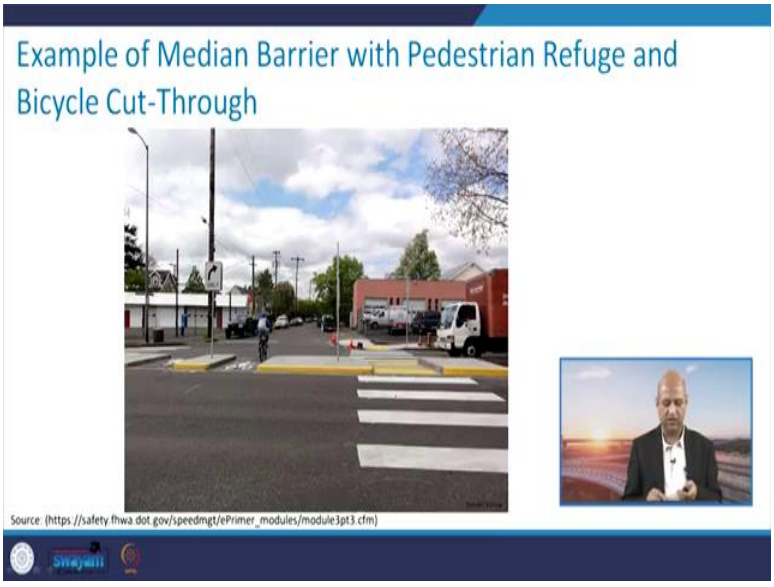

So the raised height can also help in reducing the speed and that way only the cyclists are allowed and the pedestrians can cross properly. So those kind of things are there.

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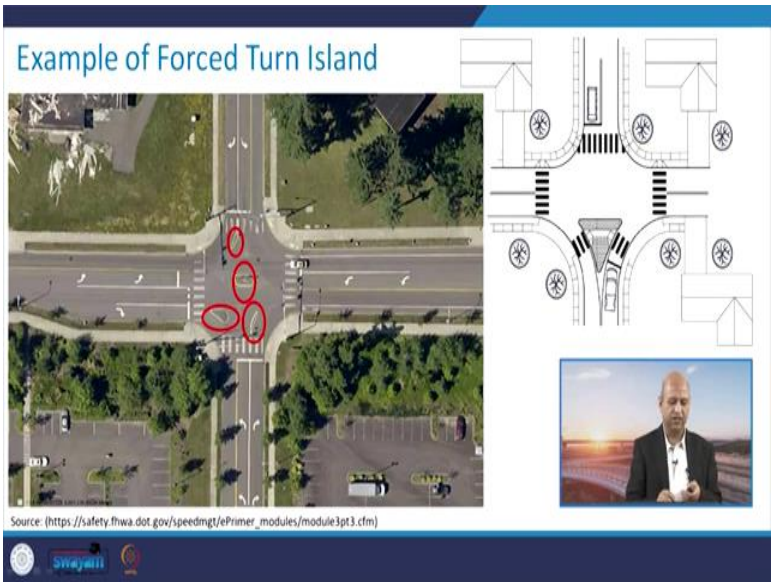

Similarly these are another example of forced turn islands, raised structures that reduces the total space and that way the traffic automatically calms down because the less space is available.

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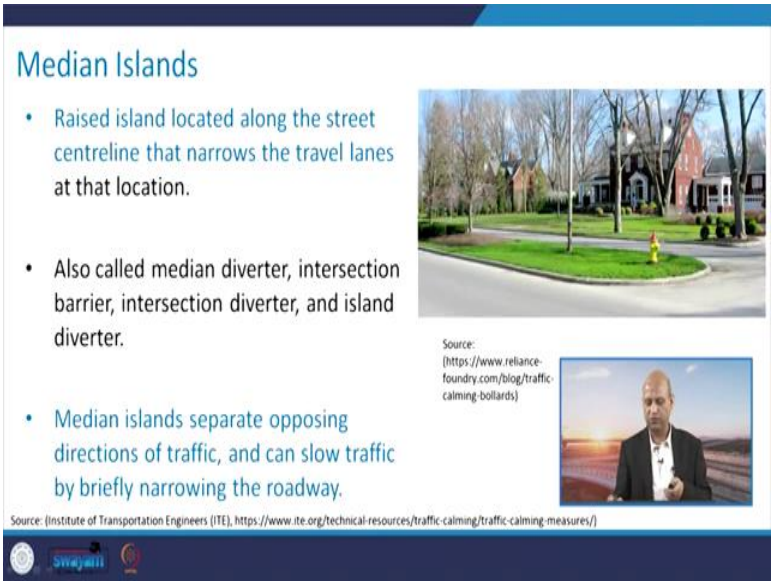

Similarly you can see here also these median islands; these are applied for reducing the road's length.

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Another example of median islands here, so it is easy for pedestrians to cross here and apply their, then there may be some these kind of median islands also, because then one has to cross that way, so one has to apply the brakes.

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These are again mini roundabout structures, so which will not allow you through way, but you have to just turn around and when you are trying to turn around you have to apply brake, it is very natural tendency.

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Then mini roundabouts may be there, which again ask you or force you to turn to go to another side. So again the speed will be reduced. So these are the simple structures.

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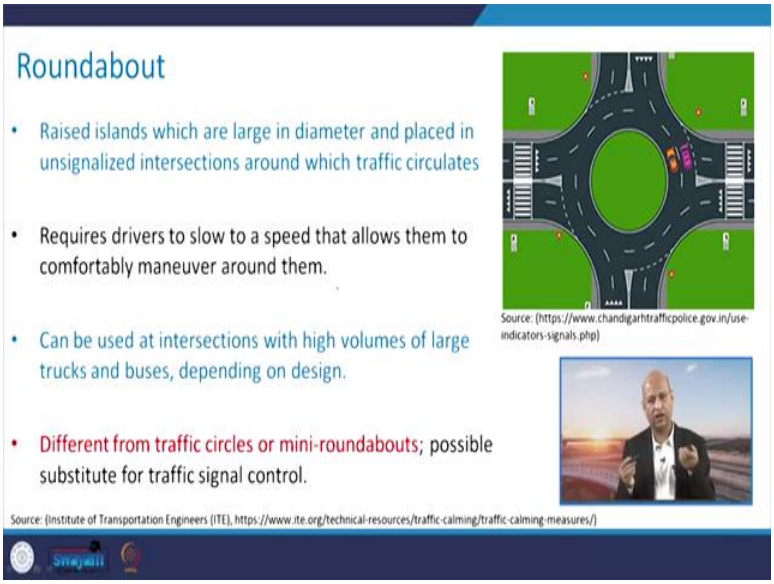

Then larger roundabouts may also be there where signals are not there so roundabouts can help in reducing the speed and guiding the traffic in a proper way.

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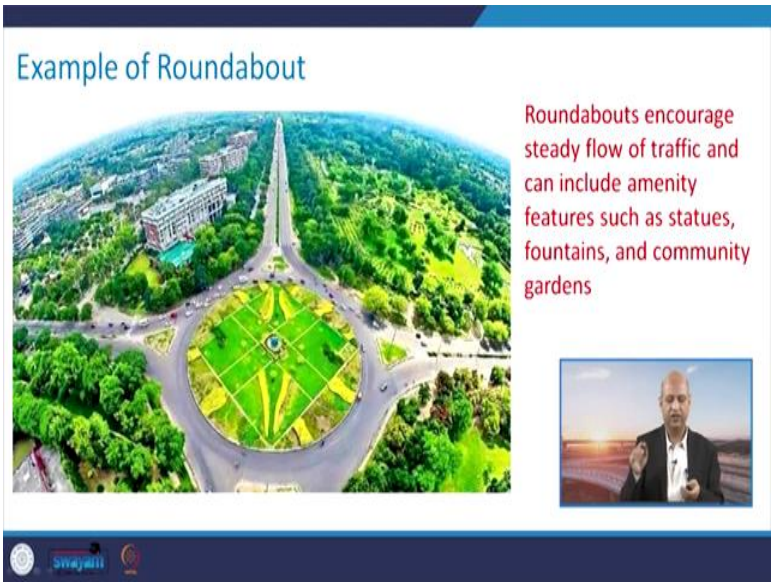

So this is, these kind of beautiful roundabouts can be there, if some of you have visited Chandigarh, a lot of beautiful circles are there in Jaipur also. So many cities are having these kind of large size roundabouts where it can also add to the aesthetic value as well as it can direct the traffic and reduce the speed.

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Then on-street parking, also one way to reducing the width of the road and that way the traffic speed will be reduced and this parking can be parallel or diagonal or something like that.

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So you can see these kind of parking can be there, diagonal parking this way.

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Or it can be parallel parking like that way. So this space can be provided for parking and the less space available will force you to reduce the speed.

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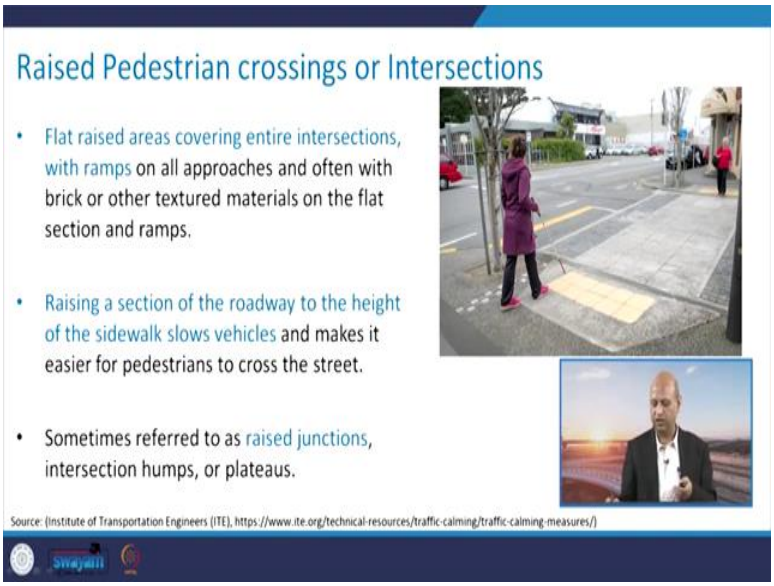

Well there are raised pedestrian crossings so that when it is this elevation of this particular place is more than the normal road, then again the people will apply the brake. So people can walk through this normally and it will help them to walk properly.

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These are again the same things, like this is raising the elevation, then this is constant for the people who wants to cross the road and then again the level is down and again the road of the

same level is there. So those kind of raised pedestrian crossings can be made and kind of calming situation can be achieved.

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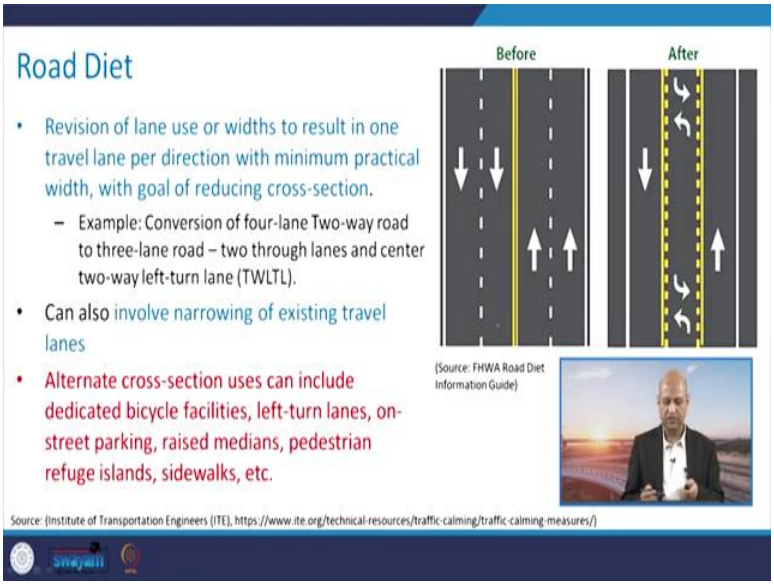

Similarly there may be some road diets again by some structure narrowing down, so that way you can have this particular, this is before, after having this particular width only for turning around or some parking may be also be there, so the reduced width will force the people drive at the less speed.

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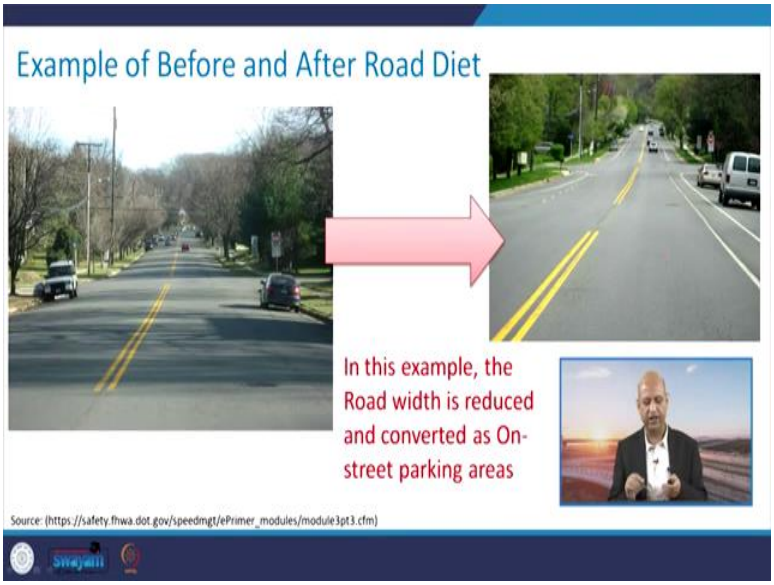

So these are before and after road diet, you can see most of the space is given to other activities and less space is available for the cars.

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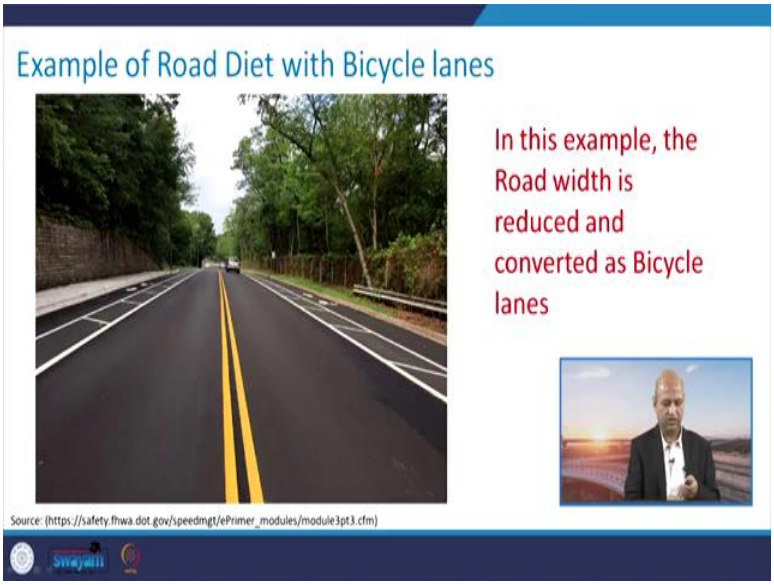

Again these are the spaces for parking, et cetera, and less space is available for movement of the cars. Some people may argue that it will increase congestion or more fuel burning, et cetera, but as you know we have to trade off, always, means cost benefit or risk benefit analysis always ask us to trade off that what we want, means it is better not having the traffic accidents, fatalities and maybe a little bit slower speed if time is taking more then fine, we are saving our lives and a lot of trauma which takes after the accidents, et cetera.

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So these kind of road diet structures can be implemented, this was before, this was after. So that can again help in calming down the traffic.

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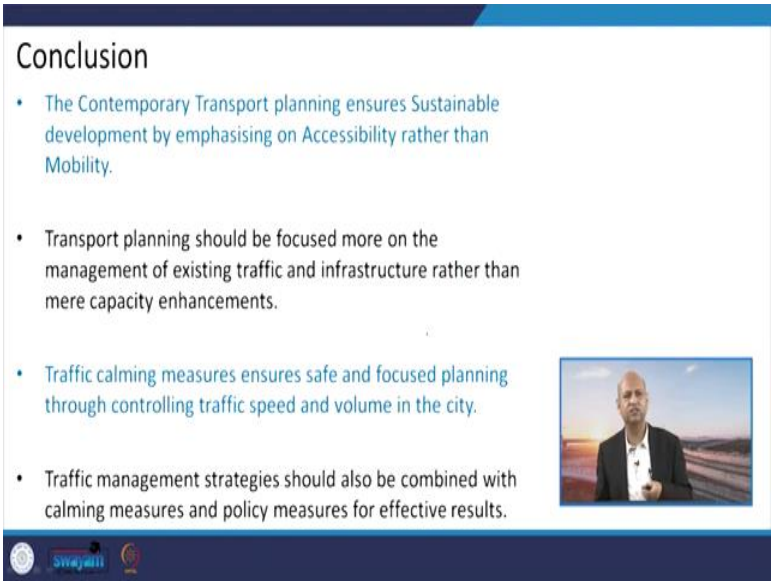

So in conclusion we can say that this contemporary transport planning, which really ensures about meeting the demands of the people in a sustainable way, in holistic way, in systematic way and it promotes the accessibility rather than only the mobility. So that is the better way of planning the transport system, rather than only the forecast based and mobility related planning.

Then also we can say that it should be focused more on the management or existing traffic and infrastructure rather than more capacity enhancement, just putting money, building more roads and then having more cars, then again congestion. So rather than integrating different kind of transport modes, so focusing on the available infrastructure and integrating them in a proper way, in a smooth way, in a sync kind of harmonious way.

And traffic calming measures should be ensured so that less noise is there, less pollution is there and because of less speed, less accidents are there, those kind of things we can achieve by these measures. And these traffic management strategies which are very important to combine these calming measures with other effective results of the people's requirements related to transport needs.

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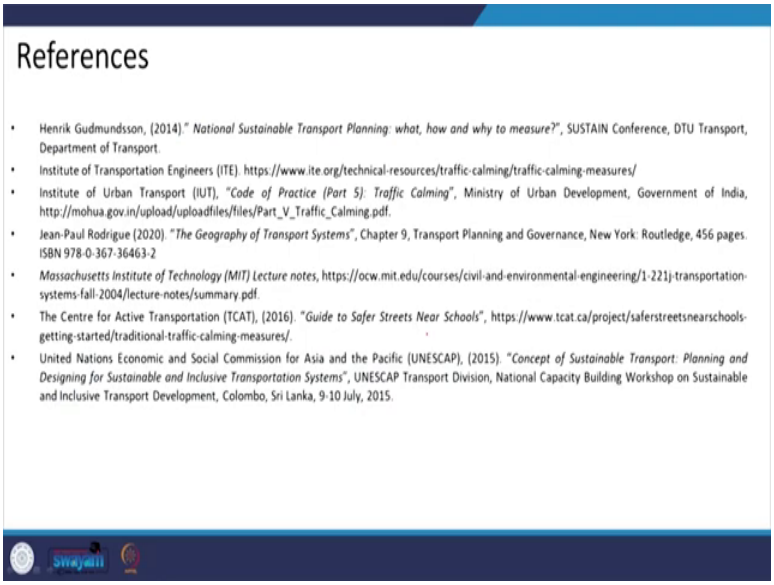

So these are the references which you can go through for additional information, and thank you for your attention on this particularly contemporary way of transportation planning, which is in the direction of sustainable transportation planning. Thanks again.