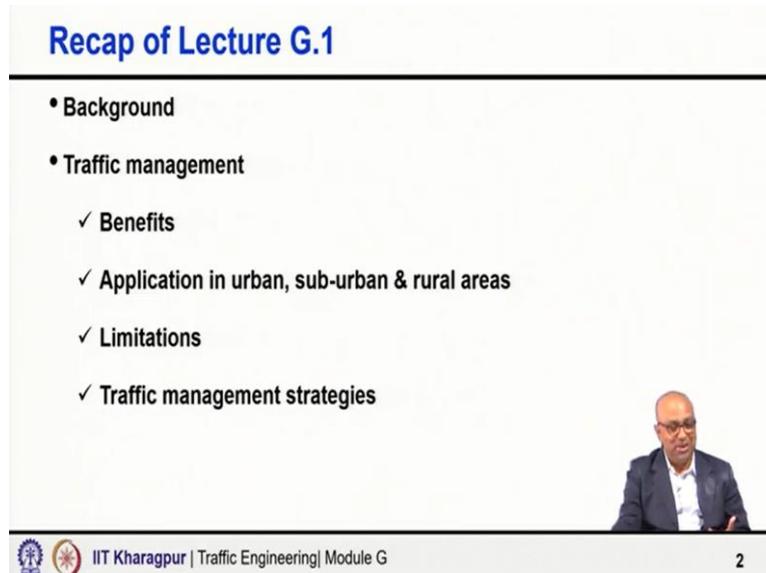


**Traffic Engineering**  
**Professor Bhargab Maitra**  
**Department of Civil Engineering**  
**Indian Institute of Technology, Kharagpur**  
**Lecture 52**  
**Access Management**

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The slide is titled "Recap of Lecture G.1" in blue text at the top. Below the title, there is a list of topics: "Background", "Traffic management", "Benefits", "Application in urban, sub-urban & rural areas", "Limitations", and "Traffic management strategies". Each item is preceded by a bullet point, and the last four items have a checkmark. In the bottom right corner, there is a small video inset of Professor Bhargab Maitra. At the bottom of the slide, there is a footer with the IIT Kharagpur logo, the text "IIT Kharagpur | Traffic Engineering | Module G", and the number "2".

Welcome to Module G, lecture 2. In this lecture, we shall discuss about access management. In lecture 1, I mentioned to you about the need for traffic management, why the traffic management is becoming increasingly important, what could be the benefits, where we can apply or where we should apply traffic management, what could be the potential limitations and about different strategies, the four major strategies, I indicated. And the first one was access management. So, today's lecture or this particular lecture is on access management.

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Access Management

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A small inset video of a man in a suit is visible in the bottom right corner of the slide.



Access Management

- Access management (AM) is a design strategy to **control access** to roadways, intersections, lanes, and parking facilities
- AM allows agencies to **manage vehicle access points**, like driveways and intersections, to help road users safely and efficiently access desired locations like residences and businesses
- Successful management of access points promotes the **safe and efficient use** and overall **operational viability** of the transportation system
- Good access management will look into the possible future of a site under development



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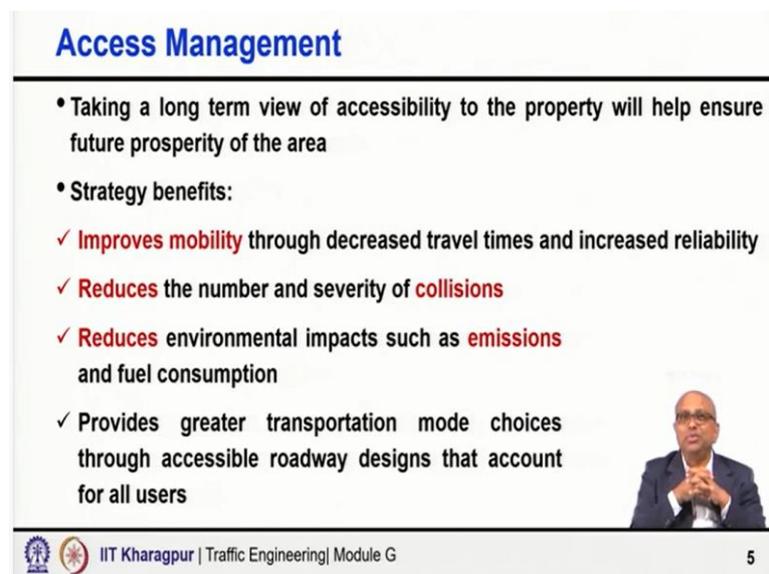
So, what is access management? It is a design strategy to control access to roadways, intersections, lanes, even on parking facilities or even to parking facilities. Access management allows agencies to manage vehicle access points, for example, driveways and intersections, to help road users safely and efficiently access desired locations such as residences and business.

When a road is passing through, people need to access the abutting land, because there may be residences, there may be businesses, there could be also other vehicle access points, minor roads or other roads are meeting these particular roads. So, how this overall access to different roads, driveways, abutting facilities and land use residences and businesses, how to provide access duly considering the road functions, mobility aspects and need for giving, providing access.

So, how to balance all the things as per the land use, as per the requirements of road keeping in mind safety, as well as operational efficiency or mobility. Successful management of access points, how to provide access, promotes the safe and efficient use and overall operational viability of the transportation system.

Obviously, good access management will also look into possible future of a site which is presently under development. So, that means while doing the access management, we look at the present scenario, that is important. But also, we should also think of the, what could be the future requirements of a site which is under development, that means we know that this kind of facility or establishment is going to be here. So, we can actually try to assess what will be the requirements for access. And therefore accordingly, plan the whole access part.

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**Access Management**

- Taking a long term view of accessibility to the property will help ensure future prosperity of the area
- Strategy benefits:
  - ✓ Improves mobility through decreased travel times and increased reliability
  - ✓ Reduces the number and severity of collisions
  - ✓ Reduces environmental impacts such as emissions and fuel consumption
  - ✓ Provides greater transportation mode choices through accessible roadway designs that account for all users

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Taking a long-term view of accessibility to the property will help ensure future prosperity of the area. We want the road to function properly. We also want the business and all other activities to grow. Roads should not be an obstruction to the growth, rather it should add but it should add keeping in mind the function of the road, the objective of, basic objective of that particular category of road and without any compromise to the safety.

There are several strategic benefits which may include improvement in mobility, proper access means mobility might improve through decreased travel time and therefore, increase reliability, the fluctuations in the travel time may be reduced. Also, the benefits may include reduction in the number and severity of collision, without proper access management, because of this conflict, what typically an example is Indian roads.

We have built our highways, but because of not looking at the access management part, with the required focus, with required importance, accessibility, mobility conflict is there and so, many accidents or crashes are happening and so, many fatalities are also happening. So, proper access management can help us to reduce the number and severity of collision, also help us to reduce environmental impact such as emission and fuel consumption because you are actually improving the mobility. So, the congestion is reduced.

So, obviously the environmental benefits will be there. And also, may help us to provide greater transportation mode choices through accessible roadway designed that account for all road users, promote, not that only for motorized vehicle or only for one or two modes, but range of modes including the non-motorized transport such as bicycle, walk, everything together in an again probably in a multimodal framework. So, this access management, proper access management can help us to achieve that greater transportation mode choice through accessible roadway designs that account for all road users not only motorized traffic, or vehicles.

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## Access Management

### Principles for Effective Access Management

**Provide a Specialized Roadway System**

- It is important to design and manage roads according to the **primary functions** they are expected to serve
- The main function of **freeways** and expressways is **mobility**, i.e., high speed and long distance travel
- In contrast, the main function of **local roads** is to provide **access** to abutting properties
- Arterial and collector roads traditionally function between these two extremes





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Now, going to the next part, principles of effective access management. We are calling them as principles but these are also in a way interventions, help us to think of the compatible interventions. So, when I am saying some cases, I will really talk about the principles and some cases it may even eventually be more like interventions, also helping you to understand what kind of interventions may be required, with that principle.

The very first one is provide a specialized roadway system. What I mean by that? It is important to design and manage road, according to the primary functions they are expected to serve. As

you know, every road or in general a road has got two functions, providing mobility, providing access to the abutting land or whatever you say, access functions or accessibility and the mobility functions.

Now, the whole functional classification is built on this, I have shown this diagram even on earlier occasions. One way you have mobility, one way it has accessibility. And as the mobility is increased, accessibility has to be reduced. If the accessibility is increased, the mobility has to be reduced. So, we cannot achieve high accessibility and high mobility.

Again, I will say like Indian conditions, we have tried to achieve high mobility but we have not restricted or done proper access management. So, in a way we have actually without proper access management we tried to achieve also high accessibility or high level of access. So therefore, trying to achieve both, not able to achieve anything. So, creating conflicts and thereby, so many road crashes are happening and so many fatalities where, we have to bear.

So, you will see the freeway if you consider, its mobility is the prime function. So, the main function of freeway and expressway is the mobility, that is what is the function of that road, that means high speed and we expect long distance travel on those facilities. So, these roads are not to provide access to abutting land. No, that is not the primary objective.

In contrast, the main focus of local road is to provide access to abutting properties only, it is not expected to serve long distance trip and high mobility, that is not the requirement. And arterial and collector, traditionally will be in between, to some extent has to care for accessibility, access part and also look at care for the requirement of the mobility.

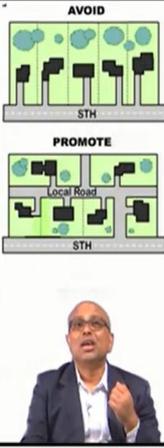
So, when we are trying to do access management, the very important thing is what is the classification, what is the functional classification of road? How much should be the focus on access? And how much focus should be on mobility? Accordingly, do the access management and in a way also do the mobility management, both. So, provide a specialized roadway system. So, you know a given road, what is the function of that road and accordingly decide what should be the access management.

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## Access Management

### Limit Direct Access to Major Roadways

- By providing more access to adjacent properties on the highway or arterials, its ability to move traffic declines
- Allowing access only via intersecting streets rather than at each abutting property preserves the public investment in a road
- Limiting property access to a main highway and providing cross-access between businesses can aid pedestrian travel since motorists can walk to from store to store rather than drive



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Second, limited direct access to major freeways or limit the direct access to major roadways. In continuation to what I said, we have built roads connected every village to the highways like this, practically anybody, everybody even if I want to build a take a plot and build a house, I will directly go to highway. Thousands and thousands of people can directly come to road like this, direct access, you can see, these are the habitations and directly people are coming and meeting the road.

Just imagine how much conflicts we are creating. And if this road primary function is mobility, because this we are assuming that these are major roadways, so higher order roads where the mobility is important, you can see how much conflicts we are creating and therefore no wonder why the number of crashes is going up. And with so called good road means good pavement condition, good geometric, the speed of the through vehicle will be high and with this sort of conflict obviously the crashes will in many cases will result into fatalities.

What we need to do is something like this, not a direct access to the higher order roads or major roads where the primary purpose is mobility, but all such habitations and buildings and adjacent development should connect to a local road. The purpose of that road is to provide access. So, immediate access to the adjacent plant, not the through route, higher order through route.

Then, eventually, with the proper design, you are giving connection to this local road, to this through route. So, you are only creating one junction and you were carefully designing the junction as per the requirement to cater to all movements and everything, but the remaining all

the things which are happening all around the local roads, primary function where is the access, not the mobility.

So, allowing access only via intersecting streets rather than at each abutting property preserves the public investment in a road. Limiting property access to a main highway as I have shown here and providing cross access between businesses through this local road system can aid the pedestrian travel since motorist can walk to or from store to store rather than drive, somebody wants to go from this place to here does not have to come to main highway and go.

So, simply can walk, simply can probably use the bicycle, local person can use bicycle, even a motorist who has come from outside can simply park his or her vehicle and walk between two establishments. So, we are restricting the access to the higher order road, but we are providing access to every habitation and every property or unit, in a very balanced manner understanding, with due understanding of the access and the mobility functions, and with due regard to safety and safety requirements.

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**Access Management**

**Promote Intersection Hierarchy**

- An efficient roadway system provides the **appropriate transitions** from one road classification to another
- Avoid connecting a road of lower classification to one with a higher classification
- For example, freeways typically connect to arterials rather than collectors or local roads
- Traffic flow is maintained on higher road classifications and **access conflicts** are generally **reduced**; appropriate access is maintained on lower road classifications

Diagram illustrating road hierarchy levels: Freeway, Major Arterial, Minor Arterial, Major Collector, Minor Collector, Local, Termination/Parking, Residential.

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## Access Management

### Principles for Effective Access Management

#### Provide a Specialized Roadway System

- It is important to design and manage roads according to the **primary functions** they are expected to serve
- The main function of **freeways** and expressways is **mobility**, i.e., high speed and long distance travel
- In contrast, the main function of **local roads** is to provide **access** to abutting properties
- Arterial and collector roads traditionally function between these two extremes



Third, promote intersection hierarchy. An efficient roadway system provides the appropriate transitions from one road classification to another. You have seen that, I have shown you this figure, freeway, then major arterial, minor arterial, major collector, minor collector, local streets, hierarchy is there. So, all what I am trying to say do not connect a local street to a freeway or major arterial, it should go, get connected to it as per the hierarchy.

So, changes in access and mobility function is happening gradually and smoothly. Not that I just bring a local street and connect it to freeway or major arterial, that will be incompatible. Anyway, so what we are saying here promote intersection hierarchy. So that means here I have shown it, freeway, major arterial, minor arterial, major collector, minor collector, local street and the termination or parking unit. So, these are typically residential areas.

So, avoid connecting a road of lower classification to one with the higher classification. So, with multiple classification in between, that is the main point. Obviously, we are connecting it to immediate higher or immediate lower is not a problem, but not jumping two or three layers in between, that is not permissible, not desirable.

For example, I mentioned this here, freeways typically connect to arterials, that is fine, rather than collector or local street. Freeway should not connect directly to collector or local street, but typically should connect to arterials. Arterials typically should connect to collector street, collector street typically should connect to local street, then the whole hierarchy will be maintained.

The higher order road, then I leave that I come to arterial, then I leave arterial I come to collector street and then finally come to local street. So, the changes are happening gradually, highest

mobility to highest level of access function, in between gradual changes are happening. Traffic flow is maintained on higher road classifications and access conflicts are generally reduced. If you follow this, if you promote intersection hierarchy in that sense and appropriate access is also maintained on lower road classifications.

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## Access Management

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### Locate Traffic Control Signals to Favor Through Movements

- Capacity, speed and safety of an arterial road may be severely hampered by crossing movements due to poorly spaced and uncoordinated signals
- **Increasing the distance between signals improves the traffic flow** on major arterials, reduces congestion, and improves air quality for heavily traveled corridors
- 1/2-mile or more distance between signals is desirable, but that may be too far for effective coordination

Signals Per Mile	Increase in Travel Time (%)
2	-
3	9
4	16
5	23
6	29
7	34
8	39





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Next, locate traffic control signals to favor through movements. Capacity, speed and safety on an arterial road may be severely hampered by crossing movements due to poorly spaced and uncoordinated signals. If you are using signal, you are actually stopping the vehicle. So, there will be delay, we are enhancing safety because we are doing time segregation of movements.

But think of a through corridor arterial where mobility is quite important, much more important than the access part. And if we repeatedly have multiple signals, very closely spaced signal, so many times vehicle will stop, the delay will occur, congestion will happen, vehicle emission also will happen, happen at a higher emission will happen, higher level of emission will happen.

So, here we have shown here that signals per mile as it is increasing, what is the increase in travel time in percentage, how much percentage increase in travel time. So, you are clearly seeing the more number of signals per mile means more travel time or increase in travel time. So, what we need increasing the distance between signals and if we can do that we will be able to improve the traffic flow on major arterials, we will also be able to reduce congestion and we will be able to improve air quality for heavily travelled corridors.

So, heavily travelled corridors as far as possible, uninterrupted movements we should try, should not install too many signals. And if we have to install signals, some cases it might be

inevitable, an existing route network which has not been designed properly and now you cannot close an access and cannot change the thing abruptly, it will not be acceptable to the local community. So, you have to return those, in such cases we need to try to make the signal systems coordinated.

So, that coordination helps to achieve uninterrupted movements of vehicles or platoon will move along the major corridors. So, half mile or more distance between signal is actually desirable, but also remember that, as you increase the distance then the platoon will disperse. And therefore, your coordination will be more challenging and is unlikely to be so effective, say again strike a balance, how to balance.

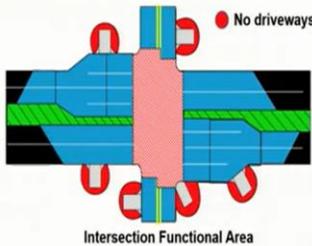
So, overall aim is that how we can reduce these interruptions and how we can promote uninterrupted movement as far as possible. But remember that this we are trying to do on a higher order road like arterials, where the mobility is really required, much more important, much more requirement is mobility, not so much on access. There only we are trying to do such kind of interventions and access management.

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**Access Management**

Preserve the Functional Area of Intersections and Interchanges

- Functional area is where motorists have to make numerous decisions regarding turning, stopping, accelerating, exiting, merging, weaving, etc.
- Accesses that are too close to intersections or interchange ramps can cause serious traffic conflicts
- Driveways should be located outside the functional area



Intersection Functional Area



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Next, preserve the functional area of intersections and interchanges. What is functional area? You know that this red shaped, it is typically intersection area, where conflicts and everything is happening, turning movements and conflicts are happening, but intersection functional area is beyond that as well.

So, functional area is where motorists have to make numerous decisions regarding turning, stopping, accelerating, decelerating, exiting, merging, weaving, etc. So, the blue portion and

the red portion in between, all together is the functional area. Why we are seeing the blue portion? A vehicle which is trying to take a right turn will start taking a decision even when at this point.

So, the perception, reaction, deceleration everything starts taking the vehicle to the storage lane all this so, as long as the vehicle is within this blue shaded area, and obviously the red will come in between, the movement of the vehicle is influenced and the vehicle is actually making numerous decisions, not only turning, stopping, but also accelerating, decelerating, exiting, merging, weaving, all sorts of.

So, all this complete area as shown by blue and in between the intersection area red, the whole area is known as intersection functional area. And accesses that are too close to intersection here the red portion or interchange ramps can cause serious traffic conflicts. So, all the driveways should be actually located outside this functional area. So, you have shown here, here, here, here, here, here, here, here, in all such places, the driveways should not be there.

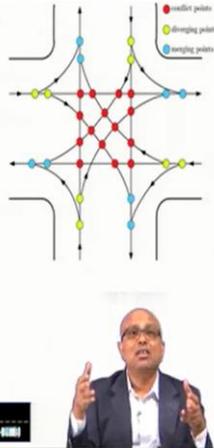
That means we do not want additional interruptions in the whole intersection functional area. But do not give access to a building, do not give entry, exit from another facility to this road or intersection area or functional area. So, the whole functional area should, driveways should not be located within this, rather all the driveways should be located outside the functional area. This area is already complicated, so many decisions drivers are bound to take. So, we do not want to add complexity. Take this out, all access driveways, take them outside this area.

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### Access Management

**Limit the Number of Conflict Points**

- As conflicts increase, driving conditions become more complex and drivers are more likely to make mistakes
- Large numbers of driveways increase the potential conflicts on the road
- Fewer driveways spaced further apart allow for more orderly merging of traffic and present fewer challenges to drivers



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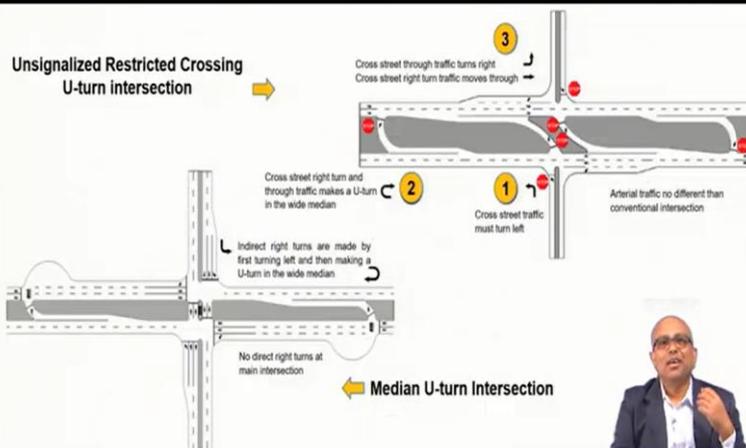
Next, limit the number of conflict points. Try to minimize the number of conflict points because as conflict increases, drivers conditions become more complex and drivers are more likely to make mistakes. So, reduce conflicts. Large number of driveways increase the potential conflicts on roads as I have shown here, you will know this, all this actually.

So, fewer driveways spaced further apart, allow more orderly merging of traffic and present fewer challenges to drivers rather than having merge so many conflicts. So, if there are fewer driveways spaced further apart, not very closely one after another or at very close proximity, if not while, they are placed farther apart and fewer in number. Then all this will allow for more orderly merging of traffic and present fewer challenges to driver.

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### Access Management

**Unsignalized Restricted Crossing U-turn intersection**



**Median U-turn Intersection**



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Here one example, slide I have taken, two arrangements I am showing, one is here arterial traffic, no different than the conventional intersection, that is fine. But what we are trying to say that we are not allowing right turn directly from these minor intersections. So, what we are doing and also not allowing the cross traffic.

So, cross street must actually take left. So, if a vehicle is approaching even if wants to go there, we are not allowing the vehicle to cross directly, take left turn then at two at this location, cross street right turn and through traffic make U turn in the wide median. So, if you want to cross then, you are taking this, take a turn through this and then if you want to take left, you are taking this left turn, if you want to move through you are moving through.

So, directly crossing we are avoiding. Follow me again, a vehicle wants to cross is not permitted to cross right at the intersection, we are trying to avoid the crossing conflict. So, take left turn then you have a wide median, take the storage lane, take a smooth U turn and then here again go to the left lane, storage lane and then take the exit, or if you want to go, go straight.

The same thing, the vehicle coming from here wants to go to that side or want to take, go to the right side is not allowed to do the maneuver directly, take left and then take this U turn and then take this exit if you want to take left turn, want to go through this minor street. So then take left turn or go straight.

Here go to the left, again similar kind of arrangement, take U turn and then proceed further. So, that means here no direct right turns at the main intersection. So, main intersection, we are not allowing any right turn. Here also if you want to come to right, go straight, take this and enter. Here also from this approach, if you want to go to right, take left, take U turn and then go straight.

So, median U turn intersection, no right turn at the main intersection. Indirect right turns are made by first turning left and then making a U turn in the wide median. So, if you have wide median such kind of designs, but the main challenge will come in countries like India, we do not have land.

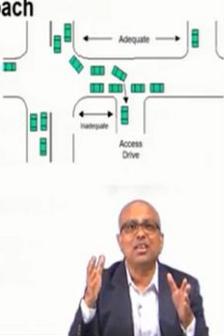
So, we have to do really lot of thinking, lot of research to see how within restricted ROW, how we can do different maneuvers without compromising the safety. That is the challenge and time has come now to face that challenge. So, we have to think if many designs you will find, they are existing but we do not have the land, we do not have really the wide median, many cases only the narrow median we can provide.

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## Access Management

### Separate Conflict Areas

- Corner clearance is defined as the distance between an intersection and the nearest driveway or access point along the approach
- Signalized intersections, with **inadequate corner clearance**, develop **recurring queues** within the functional area of the intersection that can lead to conflicts with **vehicles turning in & out of driveways**
- Effective ways to separate conflict areas include **establishing minimum distances** i.e. corner clearance standards that separate driveways from the critical approach areas of intersections



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Next strategy or principle separate conflict areas. As I said, do not make the conflict area too close. Let them be far apart, as far as possible. So, that one new term what we are introducing here is the corner clearance. The corner clearance is defined as the distance between an intersection and the nearest driveway or access point along the approach. So, this is the corner clearance. One distance between an intersection at the nearest driveway or access point.

So, in this case, you can see relatively although I have not mention the distance, but you can relatively see here this maybe adequate, but this looks inadequate, too close. So, the corner clearance here is highly inadequate and here the corner clearance is adequate. What is the corner clearance? Again, it is defined as the distance between an intersection and the nearest driveway or access point along the approach. So, it maybe two intersections also.

Signalized intersection, why we are saying it should not be close, too close, why? The reason is stated here. Signalized intersections with inadequate corner clearance suppose in such cases, develop recurring queues within the functional area of the intersection that can lead to conflict with vehicles turning it and out of the driveways.

So, if the corner clearance is not adequate, then what will happen? If there is a signalized intersection you will have recurring queues and these queues may go up to the functional area of the intersection and therefore may lead to conflicts with vehicles which are turning in and turning out of the driveways.

Now, effective ways to separate conflict areas include establishing minimum distance, that okay at least this much distance gap should be there or that means, the corner clearance

standards that separate driveways from the critical approach areas of intersection, that this much corner clearance must be there. So, I am not telling you the values or so, but conceptually trying to tell you to please understand that this is one very important aspect. So, we should have adequate corner clearance, so that we are able to separate out the conflict areas.

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### Access Management

The diagram illustrates an intersection between a 'Main Street' and a 'Cross Street'. It shows four 'Access point' locations at the corners. The corners are labeled as 'Mainline approach corner' and 'Mainline Receiving corner'. A 'Corner Clearance' area is indicated at the intersection. A traffic light is shown at the center of the intersection.

- Separating conflict areas provides better sight distance, longer perception and reaction time for motorists
- Higher traffic speed requires greater driveway separation



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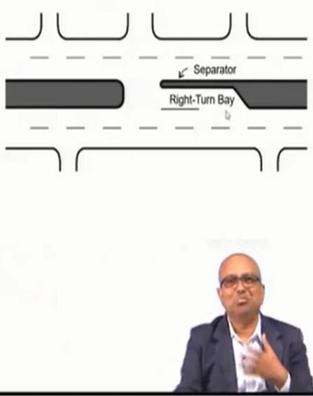
Here I have shown in a sketch, separate conflict areas provide better sight distance, if you are able to do, that longer perception and reaction time for motorists. So, obviously, the safety will be better, higher speed requires greater driveway separation, because anyhow, the whole thing is, every parameter you calculate, everything depends on that speed. So, obviously higher speed will require greater driveway separation.

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## Access Management

### Remove Turning Vehicles From Through Traffic Lanes

- Vehicles typically slow before turning
- By removing turning vehicles from the main traffic flow, vehicle speed can be properly maintained at or near the posted limit
- In addition to maintaining speed, there is road capacity preservation and potential crash reduction



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Then the next part is remove turning vehicles from through level. Often what we do, this is again a problem, many cases we do not have the wide median, if you have wide median, so many things you can do actually. But in our case, we have only a narrow median. So, we are not able to even give a proper turning radius.

So, you see the way typically commercial vehicle will take even a turn, what it will do, it will come to the, in our case, Indian scenario extreme left and to get a turning radius and then go to extreme left on the other side, see encroaching all the lanes practically, because the median width is inadequate, of course, not always, but in many occasions, wherever you have wide median provide the facility that can be done easily.

So, vehicles typically slow before turning. So, if your vehicle is right on these main streets only then it will impact the other vehicle, the impact will be there on other vehicle and even crash may occur. So, by removing turning vehicles from the main traffic flow here we are able to remove and put the vehicles in the right turn bay.

Vehicle speed can be properly maintained at or near the posted limit. The through vehicle, they should be able to travel at the, at or near the posted speed limit without restricting their speed. And in addition to maintaining speed, there is road capacity preservation and potential crash reduction, that is equally important.

These are equally important. I am able to retain my capacity because if there is a slow-moving vehicle, occupying the fast lane, this is the fast lane, which the right turn vehicle will occupy in the absence of any right turn bay. So there, I am actually occupying that so I am actually

getting reducing my capacity, my capacity is getting affected and the safety is going low because the potential for crash will be high. So, we are able to remove that and every benefit we are able to get.

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**Access Management**

Potential crash problems when right-turn is made from the through traffic lane

Right-turn lane to remove right-turn vehicles from the through traffic lanes

- Many access management design tools serve to create safer driving conditions such as separating turn lanes, carefully spacing median openings, and constructing highway interchanges and service roads

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Here I have shown the potential crash problem when right turn is made from the through lane, here you can see there is no right turn bay as I have shown earlier. So, in this case there is no right turn bay, but here there is a right turn bay. So, what is happening because not is there the vehicle is, which is trying to take turn is slowing down. So, the following vehicle sometimes may not be able to control, crash may occur and all sorts of issues, the capacity loss will happen because the vehicle is slowing down even if there is no crash still capacity will be lower.

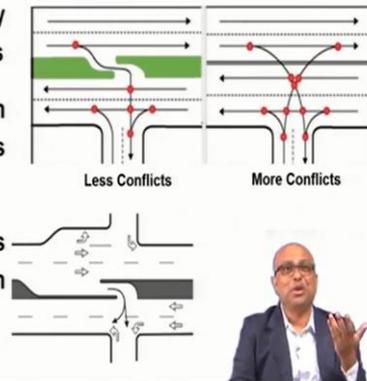
Now, once you have an arrangement like this, very smooth, the through traffic lanes are left for the through but only no capacity impact, no major safety issues for this kind of arrangement. So, everything is better. So, many access management design tools search to create safer driving conditions such as separating turn lanes, carefully spacing median openings and constructing highway interchanges and service roads.

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## Access Management

### Use Non-traversable Medians to Manage Right-turn Movements

- Medians help eliminate many conflict points by limiting right turns
- Directional median openings can safely provide for controlled access with few conflict points
- When medians are used, an access becomes right-in/right-out only with just two conflict points



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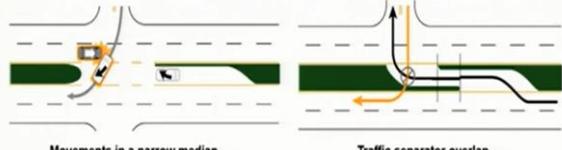
Next principle or strategy you can say, use non-traversable medians to manage right turn movement, somewhat similar to what we have already discussed. But what we are saying median helps to eliminate many conflicts by limiting right turns. Here again normal condition is like this, every movement is allowed. So, if this is right, this is also right turn and you see that how many conflict points are there.

So, here what we are saying that, use non-traversable median to manage right turns. Here we are not using right turn directly. So, with this kind of arrangement, what is happening? The number of conflict, look compare these two sketches, you can easily find out so many conflicts here that is getting reduced to only one conflict and here also these conflicts are happening, reduced to only this conflict.

So, we are actually able to reduce the conflict very significantly, that is what is the objective. If we reduce conflict, we are improving the safety. So, directional median openings can safely provide for controlled access with few conflict points. And when medians are used and access become right-in, right-out only with just to right-in or right-out only with just two conflict points, as we have shown here.

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### Access Management



Movements in a narrow median

Traffic separator overlap



Mid-block crossing

- Constructing medians with mid-block crossings can help concentrate pedestrian crossing locations thus raising their visibility to motorists
- Good access management helps pedestrians and bicyclists travel both along and across highways safely and comfortably



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This is also another sketch where we are seeing movements in narrow medians, how it happens. So, it is, vehicle is trying to come out and there is a potential and since this is a narrow median, so this is a problem actually. So, conflicts will be there and vehicle will not be able to even store within the median width.

But here traffic separator overlap we are doing so, we are not allowing this movement and maybe only one, allow a storage lane and then keep the vehicle like this. So, this is a much safer arrangement, vehicle is placed like this, long thing when the vehicle is placed and then taking turn, but here that opportunity is not there.

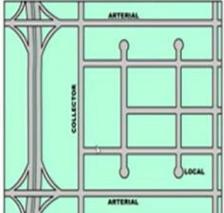
So, traffic separator overlap is actually helping us. So, constructing medians with mid-block crossing can help concentrate pedestrian crossing location, thus raising their visibility to motorists, this is again another advantage of providing if you have median and if you are constructing medians with mid-block crossing. I have shown here also some sketches so, that you can follow. Good access management helps pedestrian and bicyclist travel both along and across highway safely and comfortably.

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## Access Management

### Provide a Supporting Street and Circulation System (SSCS)

- SSCS provides alternative access and relieves congestion on major roadways
- Provides alternative routes for highway incidents or planned detours for construction projects
- A local SSCS should be protected by constructing streets crossing freeways without interchanges to encourage and enhance the movement of local traffic on those streets



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Next, strategy is providing a supporting street and circulation system. As you have seen here, we are not connecting every road to the expressway, but it is a thing local street to then the system of collector streets, collector streets are going and meeting the arterial, then the arterial with proper arrangement, grid separator, ramp we are providing access to expressway.

So, not right every house, but they are all provide giving access, giving connection, you can come out from any house and then you can use your local street, then go to collector street, then go to arterial and eventually you may go to expressway also. So, this is supporting street and circulation system, SSCS.

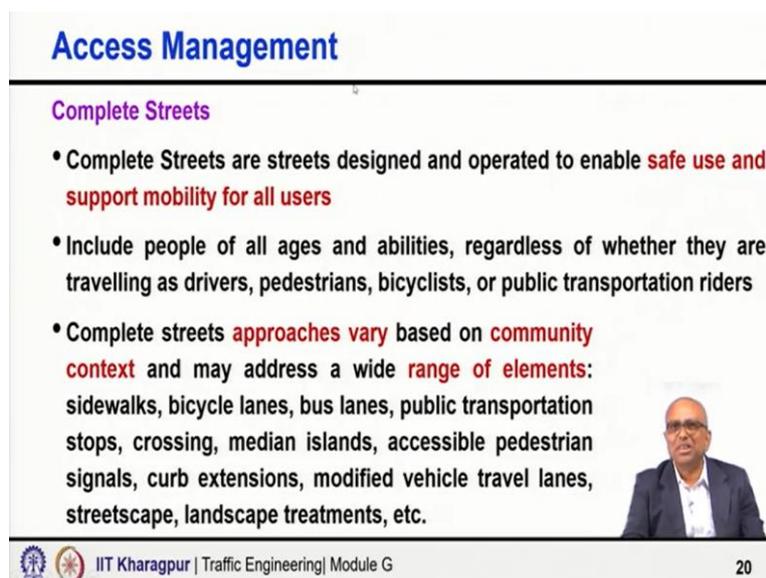
So, SSCS provide alternative access and relieves congestion on major roadways, provides alternative routes for high incidents and or planned detours for construction projects. Suppose somewhere there is the capacity is reduced and road is blocked, then this can be used as an alternative thing, only in such cases and a local SSCS should be protected by constructing street crossing freeway without interchange, that means, here it is defined locations where we want the vehicles to meet the freeway. So, interchanges are provided.

But suppose, in between to such long thing and there are habitations and the loop supporting street and circulating systems they are also on the other side, you want to get connected to the other side. So, there we are saying that it should be connected without ramp, that means no direct connection to freeways, because this is only part of this SSCS. So, people from this side want to go to another side, no use or no connection, no need to go to freeway.

So, if we can do that, that means read this carefully, a local SSCS should be protected, should be protected by constructing street crossing freeway without interchange so, in between if I have to cross, I will cross it without any interchange, I will not have interchange like this. I do not want any connections with the freeway, my purpose is not to access freeway, but to remain within these supporting street and circulation system on this side as well as on the other side of the road.

And if we do that, then what that will encourage without interchange, it will encourage and enhance the movement of local traffic on those streets, not bringing the through traffic, my purpose is not that. So, wherever you want to connect them, you connect with interchange through arterial, other is if the SSCS to be on both sides of the road, you want the exchange to happen, connect them with grid separator but without interchange.

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## Access Management

### Complete Streets

- Complete Streets are streets designed and operated to enable **safe use and support mobility for all users**
- Include people of all ages and abilities, regardless of whether they are travelling as drivers, pedestrians, bicyclists, or public transportation riders
- Complete streets **approaches vary** based on **community context** and may address a wide **range of elements**: sidewalks, bicycle lanes, bus lanes, public transportation stops, crossing, median islands, accessible pedestrian signals, curb extensions, modified vehicle travel lanes, streetscape, landscape treatments, etc.

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Next, complete streets, my last point. Complete streets are the street designed and operated to enable safe use and support mobility for all users. The most important thing, safety and support mobility for all users not only motor users. So, it may include people of all ages and abilities regardless of whether they are travelling as drivers or pedestrians or bicyclist or even public transport riders.

For every route user, every type and every class of road users support mobility and safety. So complete street approach may vary based on the community context, what is the community we are talking about, what are their requirements, what are their expectations and so, and therefore may address a wide range of elements, maybe starting from sidewalk, bicycle lane,

bus lane, public transportation stops to crossing and median islands to accessible pedestrian signals to curb extension, modified vehicle travel lanes, a whole range of things may be possible. It all depends on right community context, and therefore a wide range of elements may be included.

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### Access Management

- Complete Streets aim to reduce motor vehicle-related crashes and promote walking and bicycling by providing safer places to achieve physical activity through transportation

Cross Sectional Elements of a Street for Slow and Faster Moving Traffic

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Complete Streets aim to use or aim to reduce motor vehicle related crashes through all measures, safe provisions for all different road users and also promote walking and bicycling by providing safer places, safer facilities and therefore, indirectly or directly help to achieve physical activities through transportation, the health benefit also from transportation.

So, you can see here, I have just shown one cross section element of a street which are trying to accommodate everything, slow and faster moving traffic. You can see here, here, the main carriageway is there, BRTS Bus Rapid Transit dedicated pathway, also with adequate buffer, cycle track for pedestrians who are walking, walkway, multifunctional zones with parking bays and trees, everything is there. The road is not only for motor vehicle users, but for all and safety for all users is important.

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**Summary**

- **Access Management**
  - ✓ **Principles for effective access management**
    - Provide a specialized roadway system
    - Limit direct access to major roadways
    - Promote intersection hierarchy
    - Locate traffic control signals to favor through movements
    - Preserve the functional area of intersections and interchanges
    - Limit the number of conflict points
    - Separate conflict areas
    - Remove turning vehicles from through traffic lanes
  - Use non-traversable medians to manage left-turn movements
  - Provide a supporting street and circulation system
  - Complete streets



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So, in an integrated and holistic way it tries to accommodate, that is what is the complete streets. So, what I discussed here, why we need access management, why it is so important and what are the different principles or measures or interventions may be possible for better access management. So, series of things as listed here, I discussed. So, with this, I close this lecture. Thank you so much.