

**Urban Transportation Systems Planning**  
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**Lecture - 55**  
**Urban Goods Movement- I**


Welcome to module H lecture 1, in this module we shall discuss about urban goods movement.

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### Introduction

- Traditionally, urban transportation planning has been **biased** towards passenger transportation - **goods movement** has **not** been given due **priority**
- Over decades, transport planners have gradually realised the importance of **commodity** movements in urban areas
- The recent **pandemic** has also shown the role of goods transportation and will hopefully change the **attitude** of planners and the society at large towards **movement of goods** vehicles in urban areas



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Traditionally urban transportation planning has been biased towards passenger transportation and goods movement has not been given due priority. Even, I should admit that my course is also not an exception majority of this course out of 12 weeks, we are almost completing 11 weeks and we have discussed so far only about the passenger transportation system and very little you know practically nothing has been discussed about the goods transportation system.

However, over decades transportation planners have gradually realized the importance of commodity movements in urban areas and I must say that the recent pandemic has also shown the role of goods transportation, because we have seen that when due to the restriction or the lockdown people could not go out so the passenger traffic was very little because of the restriction of movement of course people faced lot of difficulties.

Because they could not go out, go out for job; go out for various other trip purposes, various other works, but they could not you know continue the life without supply of food and essential commodities. So, that taught us a lesson that even if we cannot go the person trips we even if we cannot make due to whatever reasons it is still we can survive but if we do not get the supply or supply of food supply of you know essential commodities including medicines, then we cannot keep the life on in a regular manner.

So, that has taught us that really how important the goods movement in our you know day to day life. Practically in urban areas it is importance is even higher because if you talk about the rural community many of the things are produced locally. So, even if outside vehicles are not coming and the goods are supply is not coming maybe everything is not produced but at least some of the things are produced locally.

People can still to some extent manage of course medicine and so many other things. People will not get supply but at least some basic food items or some of the basic commodities they can get but in urban area look at this our big cities nothing is produced inside everything has to come from outside. So, if that supply is not maintained, how this huge population which is staying in urban areas.

How they will you know get their food they get their other essential commodities and everything, so, that has probably taught us a lesson and hopefully that will change the attitude of this transport planner and also the attitude of I should say the society at large towards movement of goods vehicle in urban area because let me be honest most of us we consider goods vehicle as something problematic, of course that is not completely wrong.

Because, goods vehicle their characteristics are very different, the vehicle features are very different, they contribute to congestion, they contribute to capacity, you know they consume the capacity very fast. So, they slow down the overall traffic there are problems there no doubt but let us also appreciate and understand that we need goods movement, because the life will not go as usual and we cannot probably you know survive once the you know supply is stopped.

Especially, in urban areas where the population practically for a to z everything on a day to day basis, the supply has to come from outside urban area because nothing is produced I mean within this urban area, everything groceries to vegetables to everything it come from all of them they come from outside.

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**Basic Considerations**

- Both **passenger** and **goods vehicles** share transportation facilities and **compete** for services and resources
- Today's society is moving **more freight** than ever before
- Many **components** of transportation infrastructure are already under **stress** due to heavy traffic congestion, safety and environmental concerns
- With the **growth of freight** and increasingly **limited available resources**, **freight planning** will play an important role in the future urban transportation and economic systems

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There are certain basic considerations which are very, very important when we are talking about goods movement. Say for example that, both passenger and goods vehicle share transportation facilities and therefore they compete for services and resources. There are reasons of course there are traffic management techniques which we say are effective many during several hours particularly peak hour.

And, in many of the big cities where the demand is substantially high, passenger demand is substantially high even during the regular work hours, morning maybe 8 o'clock to 8 o'clock in the evening the goods traffic is not allowed. So, there are hours in so many context, so many cities where you will find the passenger vehicle can move with priority and the goods vehicle are not allowed.

But, you will hardly find practically you will not find any such cases where goods vehicle are allowed but private vehicle or passenger vehicle is not allowed that does not happen. The reverse or the other one happens so many times that when goods vehicle movement of goods vehicle is

restricted and only passenger vehicles are allowed to use the road but the other thing does not happen.

So, goods vehicle always have to share the road space along with passenger vehicle and they have to compete for services and resources. The other way over last few years or maybe a decade or maybe even more the consumption or the requirement of freight movement has increased substantially and today is society is moving more fret than ever before due to various reasons; you know the requirement of people have changed, the lifestyle has changed you know.

And, but many components of transport infrastructure are already under stress due to heavy traffic conditions almost all urban areas we have serious issues of traffic congestion we have safety problems we have environmental concern air quality is very bad. So, these are really the issues and the really the considerations which we should understand and keep in mind with the available growth with the you know with the growth of the freight.

And, increasingly limited available resource in every sense freight planning will play an important role in the future urban transportation system and economic systems because the freight movement directly linked to the economic activity or economic development of a place even at a gross level the economic wheels actually roll on transport in the overall sense and the goods transport really play a very significant role.

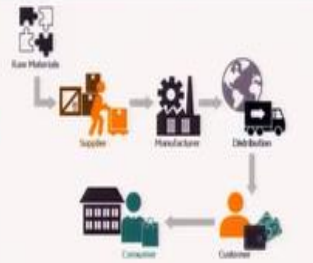
So, in future the transportation goods transportation overall sense is going to be very important consideration.

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## Basic Considerations

### Commodity Flow and Land Use

- **Spatial patterns** of goods movement demand are created by different **land use** arrangements
- It is important to understand the **interaction** between commodity flows and spatial arrangement of land uses



Let us look some of these considerations very specifically say for example, commodity flow and land use. Spatial patterns of goods movement demand are created by different land use arrangements. In fact, passengers why the travel demands are created travel demands are created by the special distribution of activities the same is true and therefore it is because it is created by special separation of activities.

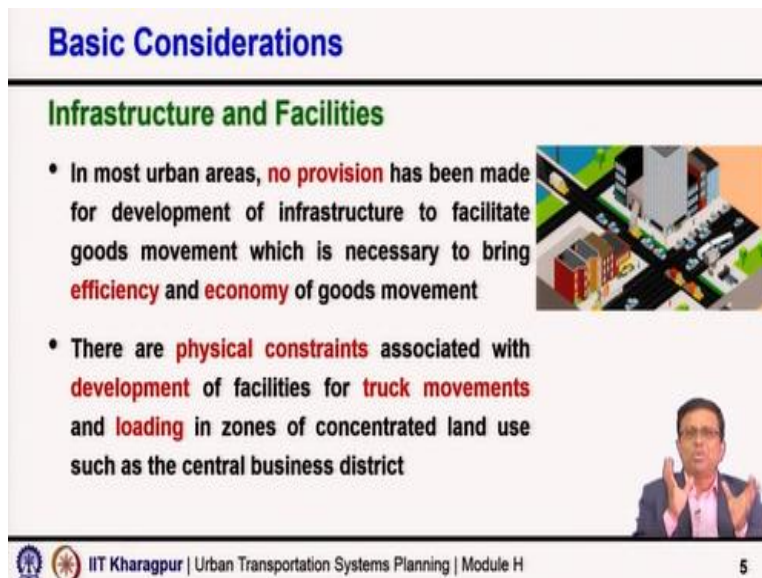
The demand has also got a spatial pattern from this point to this point people want to move this point to this point the goods movement demand is very high. So, as it is true for the passenger demand it is equally true for the goods movement as well. So, the spatial pattern of goods movements are basically created by different land use arrangements. So, if you change the land use arrangement the spatial pattern of demand for goods movement is bound to change.

The way the industries are located, the way the population distribution is there, the way the other facilities are specially located within the urban area any change happens to the land use arrangement it is bound to change the bound to impact the existing or the pattern of the spatial pattern of the goods movement. So, therefore it is very important for us to understand the interaction between the commodity flow and the spatial arrangement of land use.

Because they are they are functionally related how the commodity flow at the goods movement demand will happen that depends on the spatial arrangement of the land use. So, this interaction

or the interrelationship we must understand and let me tell you that it is really, really complex it is not so easy.

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**Basic Considerations**

**Infrastructure and Facilities**

- In most urban areas, **no provision** has been made for development of infrastructure to facilitate goods movement which is necessary to bring **efficiency and economy** of goods movement
- There are **physical constraints** associated with development of facilities for **truck movements and loading** in zones of concentrated land use such as the central business district

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Second, the infrastructure and facilities; most of our cities are not planned cities. We have not developed cities following you know sound planning principle, we did not even think of you know that the city will grow and there will be so much even requirement for the passenger travel which is you know always the priority even that component we never thought we never planned properly in big cities.

We never planned properly that how the passenger transportation would look like and what all arrangements and how the land use and how all other things should happen so that the overall passenger transportation becomes very nice or remain within acceptable level and coming to the freight or goods movement nobody thought practically. So, there was no provision in the overall city development for creation of infrastructure to facilitate goods movement.

And, these are so essential because without those you know you cannot bring without proper infrastructure for goods movement and other facilities. You cannot bring efficiency and economy of goods movement that is again is very important for the larger society because if we cannot bring efficiency and economy of goods movement then that will directly impact the population because there will be you know the supply will get disturbed.

The price will get you know impacted heavily and which eventually will impact the larger society, there are physical constraint associated with development of facilities whether you talk about passenger facility, transport related facilities or goods transport related facilities but then something still are happening when it comes to passenger transport because of our the priority is always very higher for passenger transport.

The media to people will talk about that you know the people are getting stuck into congestion, so government should develop facilities or this kind of facilities are needed and some kind of pressure will get generated you know some type of pressure will be generated and some of those things still may happen even though we have land constraints but you know people do not realize at large you know this kind of the need for this you know goods movement facilities for goods movement and therefore getting such facilities.

Say for truck movements, for loading in zones, particularly in areas of concentrated land you say in the land area civil area. Civil area no planning has been done so no land is available first of all and it is very difficult to develop the required infrastructure and facilities which can facilitate the goods movement to bring efficiency and economy so that is infrastructure and facilities is a big battle like in our context.



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**Basic Considerations**

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**Congestion and Capacity**

- As freight typically moves in large vehicles with reduced operating characteristics, particularly on roads, **increase** in freight traffic has a **greater impact** on the **capacity** of the transportation system
- With **physical constraints** associated with capacity augmentation of urban roads, the growing demand and resulting **congestion** impacts speed and reliability that increases **cost of goods**



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Then the congestion and capacity, we have you know serious imbalance between demand and supply in the road transport sector especially in urban areas and the always the demand is higher as compared to the capacity. So, the condition is there delay is there over and above all these the freight vehicles typically are large vehicles you say trucks of various sizes and all these vehicles have reduced operating characteristics.

The vehicle characteristics are very different, particularly you know the road vehicle what I am talking about so therefore as what happens that increase in freight traffic has a greater impact on the available capacity of the transportation system and therefore the level of service. So, even the passenger vehicle you will all see that if the percentage of goods vehicle changes increases in a traffic stream that the whole nature of the traffic stream will be very different.

So, driving if you are driving a personalized vehicle in a typical urban roads which is you know normally car dominated which are normally car dominated the driving experience is very different but if you are driving really on a road where there are significant number of trucks or commercial vehicles are present the driving experience is very, very different. So, with physical constraint associated with capacity augmentation of urban roads the growing demand and resulting condition impact the speed and reliability.

And, this eventually again increase the cost of goods. So, the capacity constraints whatever capacity is there the imbalance the resulting congestion all these are really important and we must understand all this when we are planning for urban goods movement.

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## Basic Considerations

### Safety

- Road safety is a major social concern in India and therefore, must be given due considerations in planning of urban goods movement
- Vehicle characteristics of large vehicles like trucks are distinctly different from small vehicles like cars which normally dominate urban transportation system
- As **freight movement** increases across all modes, **interaction** and **competition** of moving people and goods increases which also increases **safety concern**



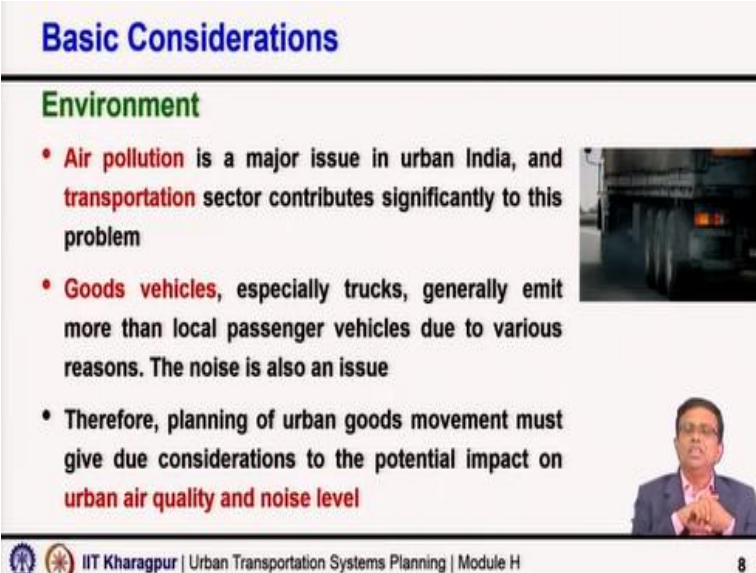
The safety is another major aspects, it is a major social concern the country wide we are really not in a not at all in a comfortable position the fatality is the highest among nearly 200 city 200 countries all over the world and the urban areas are also no exception urban areas we have serious problems with the lack of infrastructure and facilities for pedestrians and you know there are so much of there is so much pressure on the overall transport system.

So, this must be again duly considered when we are thinking of urban goods movement or we are thinking of urban goods movement because vehicle characteristics of large vehicle like trucks are distinctly different from small vehicles like car which normally dominate the urban transportation systems or in most urban areas it will be without roads if you look at the traffic the traffic is highly car dominated 50, 60, 70, 80% of the traffic in many cases will find their car traffic.

So, their vehicle characteristics the driving behaviour typically the truck drivers they are habituated to drive on the highways and long distance travel they make. So, their you know attitude of driving, driving attitude, driving behaviour is very different from the typical urban driving I should say. So, the moment the mix happen our traffic is otherwise also heterogeneous but goods traffic and passenger traffic mixing together makes it even more heterogeneous.

And, there is also a potential impact on the road safety aspect so that is to be kept in mind because we are already you know facing huge challenge in terms of safety. So, as freight movement increases except across all modes interaction and competition of moving people and good increases which also increases the safety concern. So, this again to be kept in mind.

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**Basic Considerations**

**Environment**

- **Air pollution** is a major issue in urban India, and **transportation** sector contributes significantly to this problem
- **Goods vehicles**, especially trucks, generally emit more than local passenger vehicles due to various reasons. The noise is also an issue
- Therefore, planning of urban goods movement must give due considerations to the potential impact on **urban air quality and noise level**

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Then coming to the environment urban area especially in Indian situation we have very significant problem of air pollution and in fact you know several constituents if you say are 3 to 5 times even higher than what are the prescribed limits by world health organization and the suffering is really enormous health and impact is enormous. So, it is already emission is a big issue.

And, you know why we are talking about air pollution in the context of transport because in most urban areas the transport contributes majorly the contribution is coming from the transport. There are of course, there are other sources which are also contributing to poor air quality but in majority of the urban area the primary and the predominant source for air pollution is the vehicle transport sector.

And, in many of the cities our steel conventional vehicle we are using like petrol and diesel the commercial vehicles are again almost all the vehicles are you know diesel driven vehicle, so that is again another things. So, goods vehicles especially trucks generally emit more than the local

passenger vehicle due to various reasons as I said that all trucks are basically you know commercial vehicles are basically diesel driven vehicle that is one.

Second, with the growing pressure due to air pollution, the government on the and you know there are always efforts are there to reduce or to bring down the vehicular emission through several interventions say the pollution under control PUC certification, PUC certification is made stringent and you can do that very easily for vehicles which are within the urban area. So, private vehicles the identifying vehicles taking action against those vehicle become very easy.

But, commercial vehicles which are coming from large number of commercial vehicles are entering into city from outside and the outside means because of the nature of the vehicle they could be from any parts of India. So, identifying those vehicle taken action enforcement, penalizing those vehicles is not an easy task, then the easily you know the line now the all bs 6 standard vehicles are coming.

So, all new vehicles are coming with bs 6, but if you see that in the city area you can take different policies different programs to manage or control the emission from the existing passenger vehicle fleets but taking or controlling the commercial vehicles are really challenging. The noise is also another issue because often in many areas during the day time when the passenger travel demand is very high.

The commercial vehicles are not allowed and commercial vehicles are out beyond the regular working hours but the noise is not an issue those who are staying near the catchments of the major roads in an urban area you know the commercial vehicles and with our road condition in many cities are not so good. So, the huge amount of noise is also generated so both noise and air pollution is an issue.

So, therefore planning of urban goods movement must give due consideration to the potential impact on urban air quality and as well as the noise level all these are to be duly considered.

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## Basic Considerations

### Financing

- Creative ways to **finance** projects are necessary for developing and operating freight transportation infrastructure and facilities
- Planners must have adequate tools and information to identify the improvements to be **invested** on that are needed to **maximize productivity** since **resources are limited**



Then the financing, as I said that we have physical constraints of a creating infrastructure which are required for urban goods movement for using the easy movement of urban goods. But the financing is also another issue already you know some areas the private financing is working well but here we need even to create infrastructure which are common kind of infrastructure and will benefit the overall you know the freight movement or commercial vehicle movements within the city.

So, we need creative financing we know we need creative financing to develop and operate freight transport infrastructure and facilities. So, planners and at the same time because we have serious constraint, so that we should be able to also prioritize the needs so planners must have adequate tools and information to identify improvements which are to be invested and that are needed to maximize the productivity since, the resource is limited and resource is always an issue.

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## Classification of Goods Movement Demand

- **Estimation** of goods movement demand is an important task
- Urban goods movement forecast should **duly consider**
  - ✓ Changing patterns of urban development and structure
  - ✓ Locations of terminals and transfer points
  - ✓ Land use patterns
  - ✓ Changing economics and costs of the goods movement industry
  - ✓ Labour practices within the industry



Now, for like the passenger travel demand in goods transport context also the estimation of goods movement demand is an important task and if you see there are many challenges because goods movement forecast should duly consider the changing pattern of the urban development and structure. It is actually there is a huge dynamics that is working here then the demand gets influenced by the location of terminal and transfer points what are the kinds of arrangement?

What is the land use pattern, then the changing economics and cost of goods movement industry also the labour prices within the or the practices how it is working within the industry all this will impact the cost impact the also the demand so the demand is not very, very straight forward.

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## Classification of Goods Movement Demand

- ✓ Potential technological innovations in goods movement
- ✓ Effects of governmental policy, financial aid, and regulation on the movement of goods
- ✓ Social and environmental considerations
- **Demand forecasting** should portray the inter-relationships among industry location, inter-industry transactions, terminal interfaces, freight flow, mode choice and packaging, and urban transportation network



And, also the potential technological innovations in goods movement how we are what kind of what level we are you know ready to apply different technologies. Then effects of government policy a big way the goods transport the government policy really matters a lot. The kind of financial aid that is available and also the regulation on the movement of goods, which especially for urban goods movement that is very, very pertinent.

And, then also the social and environmental consideration. So, if you say that the demand forecasting should then portray the interrelationships among industry location, inter industry transaction, terminal interfaces, freight flow, the mode choice packaging urban transportation all these are going to you know affect the demand part. So, that is why it is much more complex.

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**Classification of Goods Movement Demand**

- Goods movement demands are created by the **economic activities** of production and consumption
- Therefore, it is important to **identify the principal economic units** in an urban area and develop an **understanding** of their internal structures and their associated commodity movement demands
- **Freight demand** analysis is much more **complex** than **passenger** travel demand analysis as it is influenced by factors related to routes to be used for goods movements, **location** of freight **terminals**, **segregation** of goods into small assignments for distribution within urban area, etc.

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We can consider that goods movements are actually created by economic activities and therefore each you know activity has got certain inputs certain outputs both are relating or both are creating basically demand for movement of goods or urban goods movement. So, if we can identify the principal economic units and to identify what kind of inputs and what kind of outputs are coming then this whole thing can help us to understand the freight requirement or the goods transportation demand in a better way.


So, as I said the freight demand analysis is much more complex than passenger travel demand as it is influenced by factors related to the what routes the goods traffic are going to take where our

terminals are located whether we are going to do the segregation of you know into of goods into small consignment or assignment for distribution within the urban area and factors like that.

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### Classification of Goods Movement Demand

- Each unit of economic activity deals with inputs and outputs



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graph LR; I1[ ] --> EAU[Economic Activity Unit]; I2[ ] --> EAU; I3[ ] --> EAU; EAU --> O1[ ]; EAU --> O2[ ]; EAU --> O3[ ]
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- A **unit** receives certain types of commodities as inputs and dispatches other types of commodities as outputs



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So, as I said that each economic activity it receives certain input certain outputs and you need to receive certain type of communities at input and dispatches other types of communities and output and both, both actually generate the demand for goods movement.

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### Classification of Goods Movement Demand

- A **manufacturing plant** receives the input of raw materials and semi furnished products and dispatches semi-finished and finished products for other destinations
- **Households** receive food and other consumer products and dispatch garbage for disposal
- **Freight terminals** receive goods that are either consolidated into large consignment for external locations, or goods that must be separated into smaller consignments for distribution within the urban area



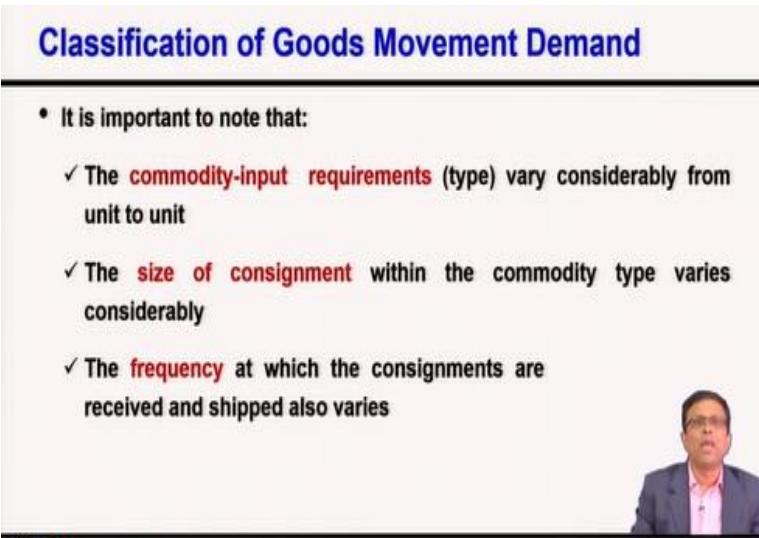
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So, say for example, and they are so much of variety say manufacturing plant receives input of raw material and semi finished product and probably dispatches semi finished or finished product for other destination. Similarly, the households receive food and other consumer product

and what we dispatch is the garbage for disposal. So, freight terminal on the other hand receive goods that are either consolidated into large consignments which are coming from external location.

And, then what we are doing then that good must be separated into smaller consignments for distribution within the urban area. So, bigger consignments are coming and then getting smaller packs or you know smaller vehicles also maybe we are using and then distributing within that urban area and not only distributing the pickup also is happening exactly in the similar form.

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**Classification of Goods Movement Demand**

- It is important to note that:
  - ✓ The **commodity-input requirements** (type) vary considerably from unit to unit
  - ✓ The **size of consignment** within the commodity type varies considerably
  - ✓ The **frequency** at which the consignments are received and shipped also varies

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So, therefore altogether it is important to note that the commodity input requirement or the type of community vary considerably from unit to unit. There is really substantial variation, so much of variations do not exist and we do not have to face this kind of challenge or this much variation when we are dealing with the passenger transport. The second, the size of the consignment within the community type varies considerably.

And, if the size of starting from very small to huge you know size of consignment and that will directly dictate the requirement of goods transport what kind of vehicle how you want to you know transport? So, the transport requirement itself will get influenced by the size of the consignment. Third, the frequency at which the consignment are received or shipped also varies. So, one way the community input requirements are varying the size of consignments are varying.



And, the frequency at which these consignments are received or shipped they also vary. So, all these make the goods transportation you know movement the goods transport demand very, very you know unique and you know not so easy. So, in we shall continue our discussion in the next lecture.

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**Summary**

- Importance of commodity movements in urban areas has been realised in the recent times
- There are some basic considerations to be taken into account while planning for goods movement in urban areas
- Goods movement demands are created by the economic activities of production and consumption
- Each unit of economic activity deals with inputs and outputs

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So, just to summarize this lecture we discussed about the importance of commodity movements in urban areas and there are some basic considerations which are to be taken to account while planning of goods movement in urban area. Then, good movement demands as we said are created by economic activities, which have you know of production and consumption and each academic you need or activity deals with inputs and outputs which generate the demand.

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## Classification of Goods Movement Demand

- It is important to note that:
  - ✓ The **commodity-input requirements** (type) vary considerably from unit to unit
  - ✓ The **size of consignment** within the commodity type varies considerably
  - ✓ The **frequency** at which the consignments are received and shipped also varies



And, finally to conclude that this one the type of goods movement the commodity type requirement, commodity input requirements, size of the consignment and frequency, vary from one context to another context or across different units manufacturing units. So, thank you so much, we shall continue in the next lecture.