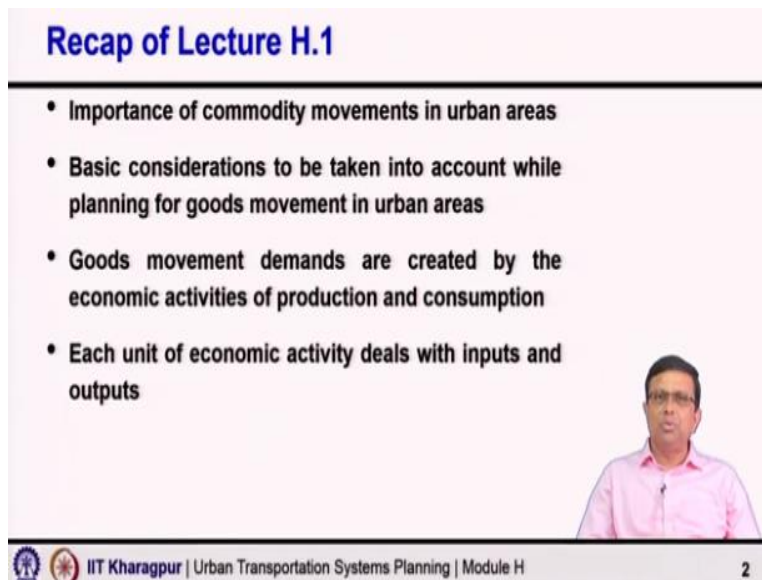


Urban Transportation Systems Planning
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Lecture - 56
Urban Goods Movement – II

Welcome to module H lecture 2. In lecture 1 we discussed about the importance of community movements in urban areas.

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The slide is titled "Recap of Lecture H.1" in blue text. It contains a bulleted list of four points. In the bottom right corner, there is a small video inset of Prof. Bhargab Maitra. At the bottom of the slide, there is a footer with the IIT Kharagpur logo, the text "IIT Kharagpur | Urban Transportation Systems Planning | Module H", and the number "2".

- Importance of commodity movements in urban areas
- 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

Why we need to care about the movement of goods vehicles within urban area? Then we highlighted the basic considerations to be taken into account while planning for goods movement in urban areas. Then we mentioned that goods demands are created by the economic activities of productions and consumptions and then each unit of economic activities deals with inputs and outputs.

And at both ends the goods movement demands are created so in continuation to the discussion on goods movement demand.

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Classification of Goods Movement Demand

- Urban goods movement demand can be **classified** based on:
 - ✓ Spatial pattern of demand
 - ✓ Commodity type
 - ✓ Consignment size



Today we shall discuss first about the classification of goods movement demand urban goods movement demand can be classified based on special pattern of demand. Because you know that the demand is special in nature it is actually created both goods demand and the passenger demands are created because of the special distribution of activities. So, based on the special pattern of demands we can classify the goods movement demand.

Then a secondary classification could be based on the type of commodity that is another consideration another way of looking at the goods movement demand for different types of commodity and the third based on the consignment size. That also may be used as a basis for classifying the goods movement demand. First let us talk about the Spatial Pattern of Demand.

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Classification of Goods Movement Demand

Spatial Pattern of Demand

- Goods movement demand may be classified as follows:
 - ✓ Movements between **urban areas** and **external locations**
 - ✓ **Inter industry** movements **within** an urban area
 - ✓ **Household based** movements **within** an urban area



Goods movement demand as per Spatial Pattern may be classified under three categories. Movements between urban areas and external locations that means we have a study area and this we are talking about movements which are between the study area and external zones external to study area so that is movements between urban areas which is our study area and external locations.

Now most cases you know this is very significant because within urban areas we do not produce any, we do not have any agriculture we do not have any other kinds of you know basic community production. So, most cases things have to come from outside so this is very significant the movements between urban areas and external location. Then the second and third types are within urban area how the goods movement demands are created?

So, second one is inter industry movements within an urban area and third household based movements within an urban area. So, if you look at these three classes first one is basically external, external two study area and then the second and third one within urban areas things are happening. The goods movement demands are getting generated one which are related to inter industry movements and the second one related to household based movements.

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Classification of Goods Movement Demand

External Commodity Movements

- Movements to and from **external locations**
 - ✓ Direct consignments
 - ✓ Consignments via urban freight terminals
- **Direct consignments** are the movements directly to and from urban activity centres and their **major** portions are made by **trucks** although some plants may have railway sidings



Let us look at this thing into little bit more details movements to and from external locations that come under External Commodity Movements that external to study area to and from areas which are external to study area and these may be further classified as direct consignments and second consignments via urban freight terminals. What is Direct Consignments? Direct Consignments are the movements of goods directly to and from activity centers and their major portions are made by trucks.

Although some specific industries or in some specific cases plants may have railway sidings as well but that is truly for big industry and for very specific types of industries not very common. So, majority is by truck, so these are directly coming that means whatever is the from outside the study area the origin from there directly it is coming to the activity, urban activity centers no transfer nothing directly it is coming up to the urban activity centers.

Similarly from activity centers directly it is going outside the study area and as I said majority of these movements are happening by trucks.

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Classification of Goods Movement Demand

- **Consignments via urban freight terminals** involve pickup and delivery components by trucks within the urban area. Freight terminal may cater to one external mode or in some cases may serve two or more modes
- **Proportion of direct consignments and the modes used for terminal-type consignments** are a function of several factors related to freight pricing and other policy measures
- **Costs of intercity goods movement** include pickup and delivery costs, terminal handling costs, line haul costs, and ownership and packaging costs of the goods while they are in transit



Second it could be Consignments via freight terminals these involve pickup and delivery components by trucks within the urban area and freight terminal may cater to one external mode or in some cases even two or three different types of mode. So, that means freight terminal is working as a kind of intermediate point so everything from outside comes only up to the freight terminal.

And then pickup and delivery within different zones inside the study area or urban area is happening separately so the consignments are not directly as it was happening earlier. Not directly coming to urban activity centers but these are all coming to the freight terminals and then from freight terminals pickup and delivery components will be added to distribute that goods both at the pickup and the delivery both ends to connect different you know zones within the urban area.

Now what will be the proportion of direct consignments and what will be the modes used for terminal or terminal type consignments? These are basically a function of several factors related to the freight pricing, pricing is very important consideration and also other policy measures you know the city wide the government may have their own policy. How whether they allow the all the external vehicles mainly the trucks to come directly up to this you know activity centers.

Or they want everything to come to the freight terminal and then internal distribution by smaller vehicle basically the pickup and delivery within the urban areas. Now as I said cost is a very important consideration in this context now cost of intensity good movements when we are calculating each case the cost is a major consideration but for intercity goods movement say cost should include pickup and delivery cost.

So, that within the urban area whatever is the component then terminal handling cost because goods are coming to terminal goods terminal urban freight terminal and then getting distributed further. So, the terminal handling cost the line haul cost when it is getting transported ownership and packaging cost of the goods when they are in transit that is again one major component so all these components are added together when we are talking about the cost for intercity goods movement.

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Classification of Goods Movement Demand

Inter-industry Movements

- These movements **within** an urban area are virtually all accomplished by **trucks** of various sizes
- Involve the distribution of semi-finished products **between** plants, the distribution of finished products to **warehouse** and **retail establishments** and so on

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Now the second one is Inter Industry Movement and that is what I said that that is happening within the urban area now these movements within an urban area are virtually all accomplished by trucks of different sizes not one type of truck. But you know various types of truck are used depending on the requirement depending on even the regulation many cases many big cities the big trucks are not allowed.

So, in that case may be the smaller vehicles are used smaller goods vehicles are used for the pickup for the distribution within that within urban area. So, these are basically inter industry movements. So, basically involve the distribution of semi finished products between plants from one plant something is produced but it is not the finished product but then it has to go to another processing unit or another industry they do the other components.

So, that way the inter industry movements for goods demand are generated. So, involve the in distribution of semi finished products between plants the distribution of finished products to warehouse first part is from you know semi finished products going from one unit to another unit and then the final finished product the distribution of those finished products either to warehouse and or the retail establishments and even so on.

So, further down the line also the distribution may happen so that is basically the inter industry movements, that is also sometimes very significant within some of the urban areas not all.

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Classification of Goods Movement Demand

Household Based Movements

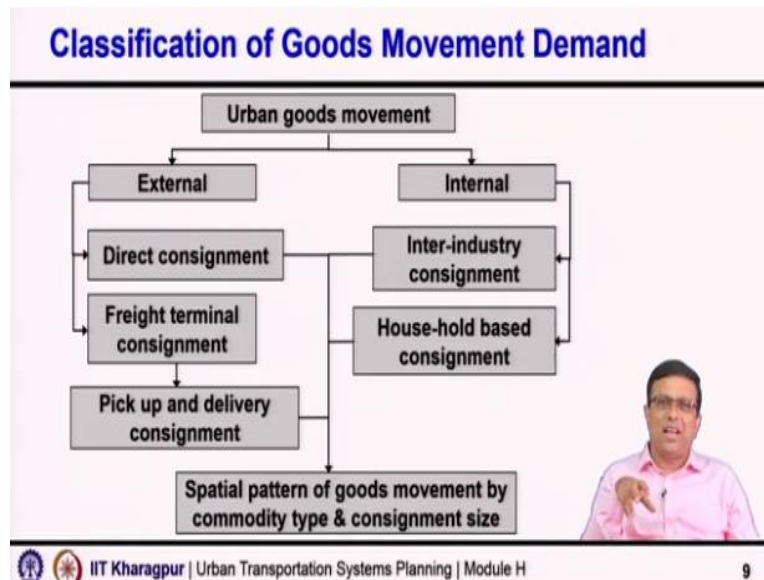
- Also termed as **resident based** goods movements
- Involve delivery of **consumer** goods, maintenance and **service** vehicles, and **public** vehicles such as garbage trucks

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The third is Household Based Movements now these are also termed at residence based goods movement. Because why residence will because we are saying it household so household also you know sometimes called that is why it is called sometimes even resident based goods movement. Now these evolve delivery of consumer goods any kinds of consumer goods you say what is required or used by households for various purposes.

Maintenance and also service vehicles and public vehicles such as may be garbage trucks these are all linked with the household. That means household is the point around which the movements or these goods vehicle demands are created.

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So, if I try to summarize this in terms of a very simple flowchart then I can say urban goods movement could be external or internal, external means outside the urban areas. So, from outside it is coming to the study area, that is external now external could be direct consignments directly coming to the activity centers or it could be through freight terminal consignments. Now if there are freight terminals which are used in between.

Then the pickup and the delivery consignments also do happen within urban area. And Internal it may get generated due to inter industry consignment and also due to Household Base Consignments. So, all together the goods movements are created and there is a special pattern by community type and consignment size and all the things again as I have mentioned earlier it the special distribution of the special pattern of demand is actually a function of also the land use how the activities related activities or units are located in different areas.

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Classification of Goods Movement Demand

Commodity Type

- A **second level classification** of goods movement demand is based on **commodity type**
- ✓ Examples: petroleum or coal products, food products, stone, clay, waste or scrap materials, chemical or allied products etc.



Another way of looking at the commodity type looking at the classification of goods movement is based on the commodity type. So, that is again another way of classifying the urban goods movement for examples you know a variety of goods are transported from one point to another point, so what kind of goods? What kind of community? Based on that a smaller or larger number of classifications; are possible.

For example petroleum or maybe coal product food products stone clay waste or scrap material even chemical or allied products and like that this list could even be longer. So, based on the type of community we are trying to classify urban goods movement and as I said you can use smaller or larger number of classifications depending on the context.

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Classification of Goods Movement Demand

Consignment Size

- A **third level** of classification is based on **consignment size**, which is usually expressed in terms of the **weight** of the consignment (for example, millions of tons)



A third way of looking at the urban goods movement classification is based on the consignment size. This is again a very important consideration a very important characteristics of you know goods movement based on the consignment size which is normally expressed in terms of weight of the consignment that means millions of tons or so how big or how small the consignment is because you know the requirement of the transport kind of vehicle.

The kind of other care or the requirements all together will also depend on the size of consignments so that is another way of looking at it so these are normally the three ways we classify urban goods movement demand. So, first based on the as I said based on the Spatial pattern of demand that is one way that could be external or could be internal could be further inter industry or household based.

That one then second based on the Type of Commodity again a smaller or larger number of classifications are possible and the third based on the size of consignment.

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Classification of Goods Movement Demand

- Different types of the economic-activity units create different **spatial-patterns, commodity-types, and consignment-sizes** for urban goods movement
- Type of mode, time of movement, truck size and so on varies with each of the above combinations



Now different types of economic activity units create different spatial pattern, different commodity types, different consignment sizes for urban goods movement. You take each unit activity unit or economic activity unit its inputs, outputs from those units you will get a wide variety in terms of spatial patterns, in terms of type of the commodity and in terms of the size of the consignment.

And these are actually influencing the type of mode to be used the time of movement when anyone want to move or when it is required to move then the size of truck. If we are using trucks for the movement as a mode then what type of trucks it is not just by road. But a variety of goods vehicles are there different types of trucks are there different consignments have their special requirements say.

As I said that if you want to carry petroleum product and if you are carrying coal if you are carrying may be the gas cylinder or some vegetables the requirements you know the type of vehicle required will also you know vary depending on all these. So, actually the type of mode time of movement truck size and all these will depend on you know combinations of the above that means what kind of special patterns are there for the goods demand and then type of the commodity and the consignment size.

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Factors Affecting Goods Movement

Locational Factors

- Freight is always a **derived demand** and usually part of industrial process
- **Location of sources** for raw materials and other inputs to a production process as well as the location of **intermediate and final** markets for their products, will determine the **levels of freight movements** involved as well as their origins and destinations



Now let us try to understand that what are the factors which influence or affect goods movement? There are several factors we shall discuss one by one. First locational factors what is what we understand by locational factors. Now freight is always you know a derived demand any transport demand being it passenger demand being it freight demand freight is also derived demand.

And usually part of the industry process so location of source of raw material where the raw materials are located and other outputs other inputs rather which are required for production process they will govern this you know demand locational factors. That is why we are calling locational factors as well as the location of not only the raw material and inputs but also the intermediate and final markets of their products.

Where finally they have to reach so at both ends you know it has to come from somewhere the raw material and all inputs and the outputs may go to some intermediate point or the final market. So, all these will determine the level of freight movements involved as well as their origins and destinations. So, when you are saying the goods movement demands this locational factors influence that very significantly.

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Factors Affecting Goods Movement

Range of Products

- Range of products needed and produced is very high, much **greater** than even the most **exaggerated** or **detailed segmentation** of travel demand by person types and journey purposes
- ✓ A given demand for bolts cannot be satisfied by providing cashew nuts. There are many commodity matrices in any study of freight demand



Second Range of Products that also one has to keep in mind you know that way the goods movement and passenger movement they are drastically different it is much more complex in when we are talking about the goods movement. Think about the range of products needed and produced that range is very high and as I said much greater than even most exaggerated or detailed segmentation of the travel demand by person type or journey purpose.

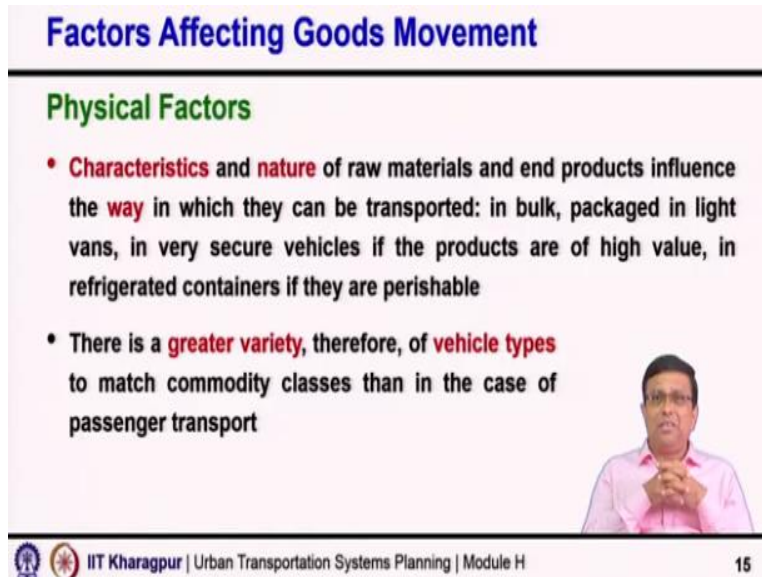
How many classifications you will do but here if you think the products so many products and each type of product is unique I mean cannot be substituted by another product and also the it is not that there is no substitute substitutes we can group together under one category or one type of product we are saying but there are so many variety of products starting from as I said that I have given an example that a given demand for bolts cannot be satisfied by providing cashew nuts.

Or if you know want to transport one kind of goods you know just think food products to chemicals to other kinds of you know domestic use whatever we need to everything we are using starting from our clothes to specs to everything you know. Just think of any product it is so much wide range and why this wide range is important for us because different types of product have got different transportation requirements.

Some may be very expensive as well some may require you are carrying something which are maybe the glass based product. So, one has to be very careful and handle with care so that it is

not broken then some may be liquid some may be solid. So, it is all different range food you are transporting it has got any again a very specific requirements. So, the range of products is really you know a very unique feature of good transport and it adds to lot of complexities when we are handling the goods movement demand.

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Factors Affecting Goods Movement

Physical Factors

- **Characteristics and nature** of raw materials and end products influence the **way** in which they can be transported: in bulk, packaged in light vans, in very secure vehicles if the products are of high value, in refrigerated containers if they are perishable
- There is a **greater variety**, therefore, of **vehicle types** to match commodity classes than in the case of passenger transport

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Then there are Physical Factors which are again also important say characteristics and nature of raw materials and end products influence the way in which they can be transported. As I said some may be transported in bulk, some may be packaged in light van, some depending on the high value products, some there are many high value products you need to transport them in very secured vehicle may be in some other case in you are transporting medicines for example.

Or maybe you know perishable goods like you know fish, vegetables you need to use sometimes refrigeration as per the requirement not may be for very short haul. Some cases like medicine vaccines you need to carry only in refrigerated containers because they have certain temperature requirements. While some other cases you only need to carry them in you know cold environment simply so that you know they are not wasted actually they remain in usable condition.

Now there is a greater variety because of these physical factors and therefore the vehicle types to match commodity class is very specific requirement and that is very different and unique if we compare it with the requirement of passenger transport.

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Factors Affecting Goods Movement

Operational Factors

- The **size** of the firm, its **policy** for distribution channels, its **geographical dispersion** and so on, strongly influence the possible use of different modes and shipping strategies

Geographical Factors

- The **location** and **density** of population may influence the distribution of end products

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Then there are Operational Factors, say for example the size of the firm the policy of the firm for distribution channels, the geographical dispersion. Note that there are units are, so many units if you say company is working company may be very small one could be a medium size company, could be a very large company what kind of products they are selling, what kind of raw material they are bringing.

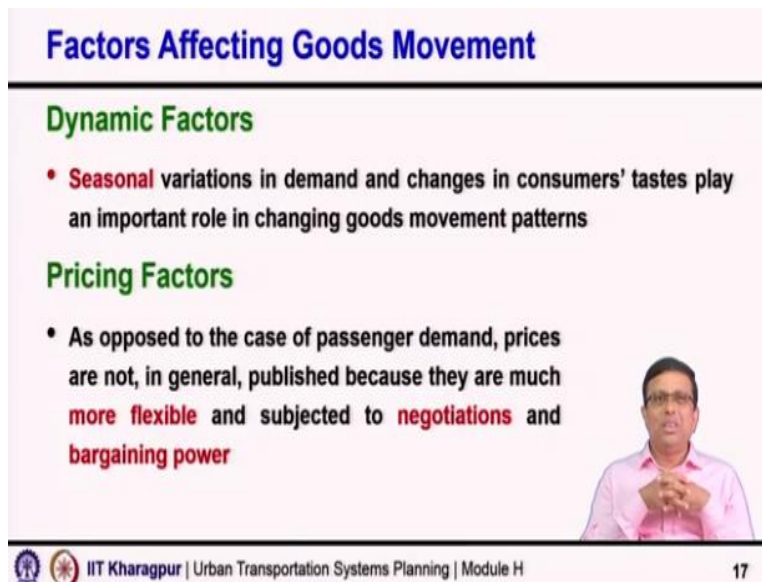
There you know what kind of policy they have for distribution to what range there I mean distributing something locally very locally will have a very different you know transport requirement as compared to another scenario whether the geographical dispersion is reasonably significant. So, that is again you know the size of the firm not everybody will use you know some industry may be they would they want to send it by truck.

But not a full truck load of goods, whereas in some cases the requirements may be such that they prefer to you know be completely kind of independent. And then in that way they would like to distribute and they would like to transport the goods both in terms of the raw materials or inputs

and also the outputs then geographical Factors that also matters a lot, where it is located? What is the density of population?

You are going to transport the goods to what is the size of the market, so how big you know or what is the density of populations. So, the location and density of population may also influence where it is located the requirements of transport in a hilly town and in a town which is or a city which is in the flat areas. The transport requirements will again be different, so the geographical factors also influence the goods movement demand.

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Factors Affecting Goods Movement

Dynamic Factors

- **Seasonal** variations in demand and changes in consumers' tastes play an important role in changing goods movement patterns

Pricing Factors

- As opposed to the case of passenger demand, prices are not, in general, published because they are much **more flexible** and subjected to **negotiations** and **bargaining power**

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There are other factors what we can call as Dynamic Factors. Dynamic, what sense or in which sense say for many of the products which need to be transported or many consignments rather the seasonal variation of demand is very prominent for example in urban areas during the summer the requirement of air conditioning units could be very high lot of sell for the air conditioning units ac units.

But winter may be not many people are really going to buy that. So, similarly something may be required more at certain particular season that is one part because the seasonal variation in demand and also the change in consumer test. Because of that throughout the year the demand is less and the change also is there in the consumer test. So, all together the seasonal variations play an important role in changing goods movement pattern.

Then a very important thing is the Pricing Factors everything depends end of the day a vital decision making factor is basically the pricing. Now this pricing is very, very different from the pricing of the road truck you know passenger transport context. Passenger transport contacts if you want to take a taxi in an urban area or want to hire a vehicle the rate is more or less fixed may be air conditioned vehicle non air conditioned vehicle depending on whether is a big car or a small car.

You know what whether it is a luxury car or kind of ordinary vehicle that those will obviously influence the price but the rates are more or less fixed. If you want to travel by bus the bus fare is fixed does not change but the commodity transport or the goods transport is entirely a different volume. So, as opposed to the case of passenger demand prices are not in general published you will not get there is no government rate rr so except for some cases.

Maybe you want to send something by rail that is a different thing but you want to transport it by truck mostly a huge amount of goods movement really takes place within urban area there is no other alternative practically everything is by road transport only. So, external sometimes may come by rail but rail or ship even by air some community but within urban area are mostly trucks. But you will not find any published rate.

Because they are much more flexible and subjected to negotiations and bargaining power the rates you know how both sides I want to send goods and you are may be involved in a business of transporting goods operating your goods vehicle both sides as per their convenience and opportunities and difficulties that things they will bargain. So, the whole thing is much more flexible and subject to very much negotiation and bargaining power. That is again very unique for the goods movement demand.

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Summary

- **Classification of urban goods movement demand**
 - ✓ Spatial pattern of demand
 - ✓ Commodity type
 - ✓ Consignment size
- **Factors affecting goods movement**



So, all together if I have to say what we discussed in this lecture we discussed about the classification of urban goods movement. And we said that the three ways the goods movements are classified; one is spatial pattern of the demand outside to inside external to within the study area directly or through freight terminals, then based on the commodity type that is another way of looking at it and then also based on the consignment size.

And depending on the special pattern commodity type consignment size each economic unit may have their own requirement for goods transportation. Then we also discussed various factors which we must understand and as these factors also affect the goods movement. So, with this we close this lecture thank you so much.