Urban Services Planning
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Lecture 45
Special Waste Management Part II

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Welcome back in lecture 5, we will continue, in lecture 45 we will continue with Special Waste Management and this is part 2 of the lecture.

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So, here we will discuss about extended producer responsibility, extended producer responsibility particularly for brand owners, there is EPR responsibilities have been for producers as well as importers, but we will discuss only about brand owners in this particular

lecture, then EPR waste collection system, biomedical waste, then we will talk about biomedical waste management rules 2060. Then we will discuss about slaughterhouse waste management, e-waste management, waste tyre management and lead battery waste management as well.

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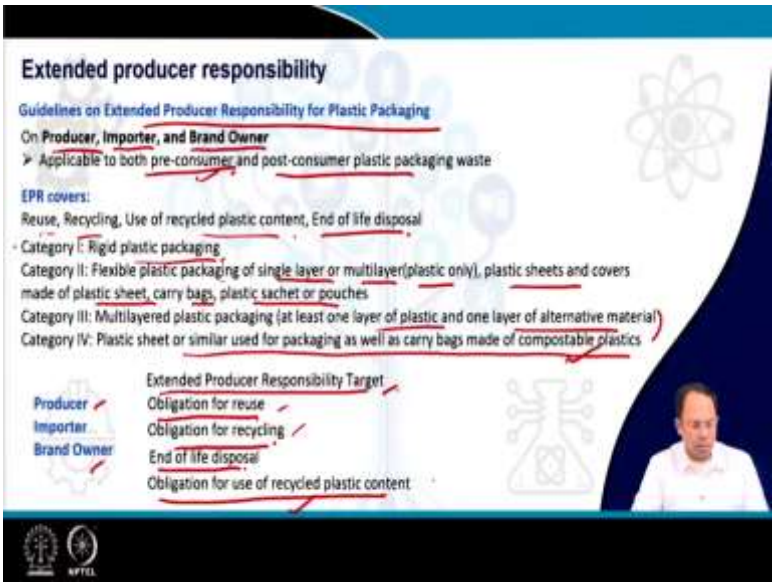

So, the guidelines of extended producer responsibility for plastic packaging is you can say it complements the plastic waste management rules, because as we have said that a lot of change has to be done at the production side. Now, we have to make sure that the producers play a big role in this particular process. So, these rules guidelines apply for producers of plastic waste importers of plastic waste as well as brand owners who use this plastic waste to create products finally to sell it to the consumers.

Now, this or so, that means this extended producer responsibility is applicable not only to post consumer plastic packaging, which in the last lecture, we have discussed mostly about post-consumer plastic waste that is being produced, but also the plastic waste which is produced at the pre consumer stage as well. So, that means, plastic some amount of plastic is utilized by the producers themselves and all and that there a lot of waste is generated at that part. So, it is before it reaches the consumer. So, that also is being considered over here.

Now, EPR more or less covers, reuse a plastic, recycling of plastic, use of recycling plus recycled plastic content in new products, end of life disposal finally, how the plastic is disposed. So, all these different aspects are covered it extended producer responsibility guidelines.

Now, here in EPR guidelines four categories of plastics are being mentioned category one, five categories sorry four categories, Category One is rigid plastic packaging. Category Two is flexible plastic packaging of single layer or multi-layer but all plastic layers, plastic sheets and covers made of plastic sheets carry bags, plastic sachets or pouches. Category three is multi-layer plastic packaging, where at least one layer of plastic and one layer of alternative material is there. So multi-layer could be all layers of plastic that has to be done differently. Whereas other multi layered is something where like a Tetra pack and all which uses multiple not only plastic, but other materials.

Category four the final one is plastic sheet or similar use for packaging as well as carry bags made up compostable plastic. So, this is what is separate from the other kinds of plastic. Now, when we talk about this responsibility, it applies to importers, producers as well as brand owners. Now, what they are supposed to do, so, there is the government has set a extended EPR responsibility target. So, that means how much percentage of waste has to be considered while we do this, you know EPR activities, then how much obligation for use, how much of that percentage is actually could be reused? What percentage of that could be recycled?

So, one is reusing of again, one is recycling that particular percentage of waste that we are talking about in EPR target and finally, how much percentage of that will go for end-of-life disposal or what will be disposed finally, and finally, obligation for use of recycled plastic content. The final thing is we can say that so much amount will be recycled fine, but what amount will be recycled in your own products. So that means obligation of use of recycled plastic content in producing your own product that also is considered.

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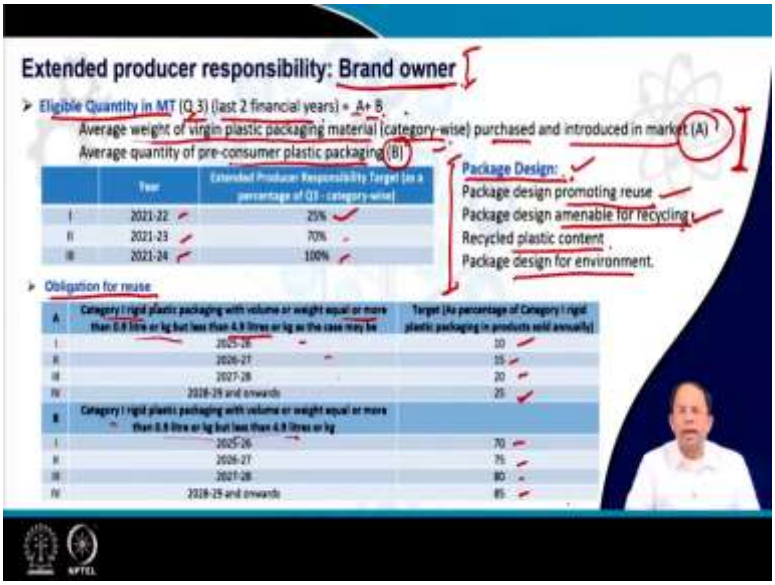

So eligible. So, when we discuss this in detail, and we are not discussing it for the importers or the producers, but we are discussing it that you can you know you can look at the guidelines which is available and you can, and what we will discuss is from about this EPR guidelines, which are for the brand owners, what the brand owners should do, what are the guidelines for them, similar guidelines are there for the importers as well as the producers as well.

Now, first of all, what percentage of material or plastic that we will consider for this you know category of you know plastic producers or users. So, the eligible quantity in metric tons in million tonnes is Q3 and this is considered for the last two financial years this has got two components the first component is average weight of virgin plastic packaging material for different categories of course, purchased and introduced in the market, which is Category A and average quantity of pre consumer plastic packaging that you are usually you are employing yourself or using yourself.

So, these two categories are together mix up the quantity of plastic which a brand owner is actually handling or producing or using you can say. So, out of that by the year 2021 by the year 2022 around 25 percent risk of that has to come standard the EPR responsibility, then by year 2023 it should be 70 percent and by 24 it should be 100 percent that means 100 percent of the overall use plastic that has been utilized should come under this year EPR responsibility.

Now, what kind of EPR responsibility we are talking about one could be the package design them itself that is how do I design the packaging of materials so, that we can you know go for this kind of we can follow the EPR responsibilities, because EPR responsibility is all about recycling, reuse and so on.

So, if the material design is such that it facilitates reuse, facilitates recycling, then it is better. So, package design has to be done in such a way so, that it promotes reuse, then it should be amenable for recycling. So, we cannot use package we cannot design packages which uses material which are not suitable for recycling. So, I it should be suitable for reuse in some case the packaging can be used for something else, or it could be recycled. Finally, the recycled plastic content, what percentage of recycled content is there in that package itself that is also important and finally, package design should be such so, that it does not harms the environment.

So, these are the different things that has to be considered by the brand owners, when they design packages for the products that they produce and eventually it goes to the consumers. So, because this is what actually this package design is what actually that generates the plastic in the first place. Now, coming to the first set of obligations, which is obligations for reuse how much amount of plastic you can reuse yourself. So, that means the targets which are set are for two categories of plastic one is category one plastic, but which is less which is equal or more than 0.9 litre or kg but less than 4.9 litres or kg of plastic.

So, this is around for the year 2025 26 this is considered as 10 percent of this Q3 value, then for 27 it is 15 percent, 28 it is around 20 percent and finally 25 percent for the year 29 onwards. So, this is the target for now. So, that means 25 percent of this Q value, this Q3 value or this total value of plastic that they are designing that should be we should be able to reuse that for some purposes. Similarly, for category one rigid but more than which are equal or more than 0.9 litre kg, but less than 0.4 litres or kg. So, in that case, the values are a little bit different it should be 70 percent, 75 percent, 80 percent and finally 85 percent. So, these are the two categories of waste two categories of plastic.

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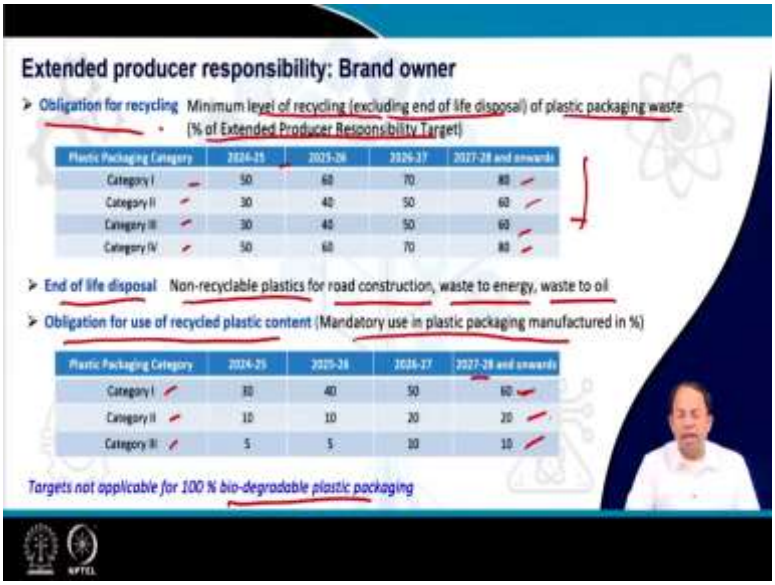

Then, coming to obligation for recycling. That means out of after reuse we should also consider recycling, which is minimum level of recycling. Leaving aside the component which goes for disposal that is end of life disposal that means we cannot recycle that a plastic packaging waste and this is also given as a percentage of the extended producer responsibility target. So, this should complement the amount which is reused. So that means reused plus recycling together should make up the amount, which is there, which is not going to be disposed of. So, disposed of plus recycled plus reuse together makes up the entire amount of plastic waste.

So, category one, again the targets are given for category one, category two, category three and category four plastics and you can see what different years separate targets have been there. So, coming to the final one for 2027 to 28 for Category one the recycling target is 80 percent for Category Two, it is 60. Same for Category three and finally, for category four, it is 80 percent. Now, once the recycling is over, the next of course, is the non-recyclable end of life disposal of plastic which includes the non-recyclable plastics and then remaining amount which cannot be recycled, which cannot be reused that should go for road construction and waste to energy or waste to oil processes, which we discussed in the last lecture.

Now, the other set of guidelines given by the government is mandatory use of plastic in packaging manufactured in percentage that is obligation for use of recycled plastic containing my own packaging content for again that is given for category 1, 2, 3, because the final one that is biodegradable plastic cannot be you know, recycled in that sense. So, of course, for

category 1, 2, 3 these rules are given here again, if I go for the final one that is for the year 27 28, the category one the 60 percent of material has to be mandatory used in my own product 20 percent For Category Two and 10 percent for Category three.

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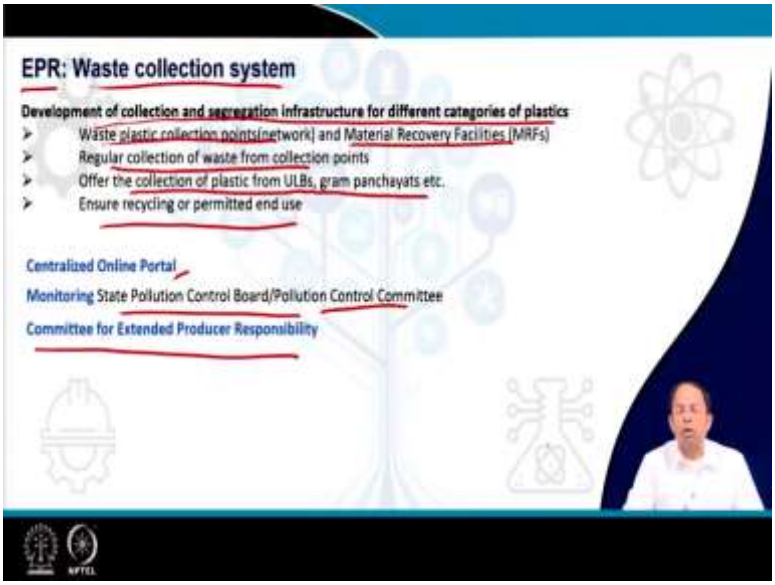

Now, along with these basic targets in regard to production, the extended producer responsibility also extends to the plastic waste collection system that means that there is responsibility from the producers or importers or the brand owners to also collect back the plastic that we have learned earlier as well. So, development of collection and segregation infrastructure for different categories of plastics, so, that has to be taken up. So, as we know that plastic has to be subcategories. So, a lot of effort has to be put in. So, this producers or brand owners, they can actually set up this plastic waste collection points and they can create a network of that, so, that and along with material recovery facilities, where this kind of processing can be done.

So, they can also participate in the collection process with from this particular collection points and offered the collection of plastic from ULBs gram panchayats, so, they may ask the ULBs and panchayats that they are interested to do this kind of processing and so on. So, they may be interested to this kind of work. So, they can take over the collection and segregation sorting process for plastic and ensuring recycling are permitted end use of plastic. So, as there is also need for a, there is also guidelines also state about the need for a centralized online portal. So that we can track how much is being you know, how the producers this importers or the brand owners are actually doing recycling or reusing plastic and so on.

And the monitoring has to be done by the state pollution control board or pollution control committees, and there has to be a committee for extended producer responsibility which you know, revises these guidelines after certain times. So, that is all about extended producer responsibility. And as you can understand without extended producer responsibility, we cannot reduce the total quantity of waste that is generated for plastic of course.

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Then coming to the other kinds of special waste, we will talk about biomedical waste. So, again, biomedical waste is that which is generated during diagnosis, treatment or immunization of human beings or animals or research activities, pertaining thereto or in the production of production or testing of biological or in health camps including categories mentioned in schedule 1.

So, the biological waste management rules in schedule 1, it gives a detailed list of what categories of waste is there and what falls under those categories. Usually, they are the categories there are four categories and they are also coded in different colours. As you can see over here yellow is infectious waste, which contains anatomical waste, chemical waste, solid waste, chemotherapy waste, discarded linen medicines and arbitrary waste.

Then infected plastics plastic material which gets infected with this kind of material. This is contaminated plastic waste. So, this definitely we cannot reuse but here because it is plastic. After proper treatment, we can use this, then glass waste and metallic implants it goes in the blue container and finally metal sharps, which includes all those materials which has got like your injection syringes and all these things which are also dealt with separately.

Now, in addition to this biomedical waste bio-medical facility itself generates other types of waste as well. So, for example, kitchen waste, store waste, residential waste collected from residential facilities, gardens and so on. So, usually we assume that out of all the waste that is generated from this kind of facilities, only 25 to 30 percent is biomedical waste and that has to be handled separately and with proper care, whereas the rest of the waste can be considered as part of the normal municipal waste streams and can be handled accordingly.

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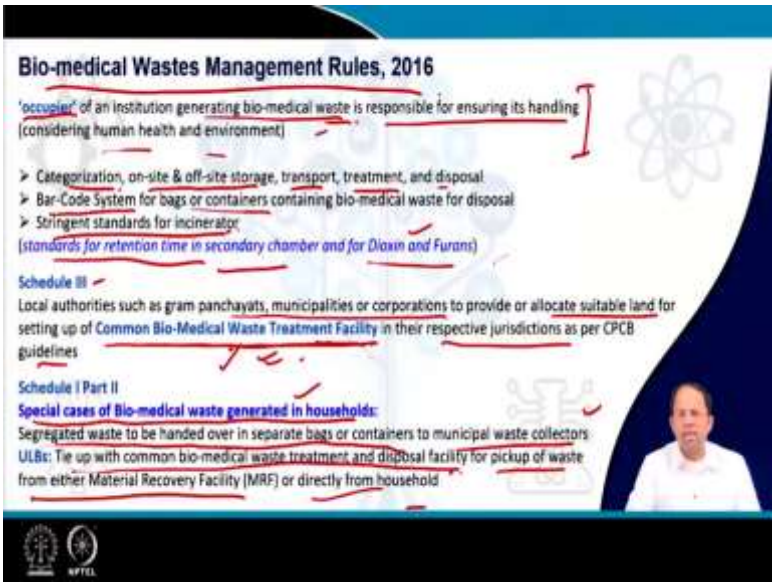

Now, in regard to the biomedical waste management rules, I will point to certain highlights of this particular rules. One is of course, the term occupier this has been utilized, which is basically an institution generating biomedical waste and is responsible for ensuring its handling and, and the handling has to be done so, that the human health and environment is not affected. So, the responsibility goes to the occupier of any kind of institution which generates this kind of waste.

So, that means, this is not the responsibility of the ULB directly. So, whatever other waste is generated, it is the responsibility of the ULB to collect, segregate and process that waste, but the biomedical waste itself is not the responsibility of the ULB. So, this has to be there this has to be managed by a separate system. So, there has to be proper categorization of biomedical waste like we learnt in the last slide, what are the different categories.

On site and off site storage rules for them transport mechanisms, treatment and disposal mechanisms for this kind of waste. Again this treatment mechanism is different the lot of

incinerators, autoclaves all these different materials or processes are utilized, but again, these are not directly the responsibility of the ULB.

The bar now, what is suggested is the use of a barcode system for bags and containers. Now, as you know, that barcode system helps us in tracking the movement of the waste from one area to another. So, if we can you know, in case of some contamination or in case of some discrepancy, this barcode system can help us in tracking where the problem is and accordingly we can address that particular problem. Now, the incinerators that are also proposed, there are a lot of stringent standards that are developed for the installation process as well as the incinerators that are used to handle this biomedical waste.

So, because these are special kinds of waste, they need to be treated in separate ways. So, there are standards for retention time, particularly in the secondary chamber of insulators we have learnt earlier about insulators process. So, in the secondary chamber the retention time is controlled, so, that dioxins and furans are not produced. So, this is one big toxic element which has to be reduced.

So, these are some of the aspects that has to be looked into. In addition, there are different schedules in this particular waste, schedule 3 talks about local authorities such as gram panchayats, municipalities or cooperation. This is the role of ULBs to produce to provide our allocate suitable land for setting up common biomedical waste treatment facility in their respective jurisdiction as per CPCB guidelines.

So, their job is to produce the provide the area where this kind of common biomedical waste treatment facility can be generate or they could be set up so, that you know this kind of treatment can be done, but the collection and all this process is actually managed by the generator themselves.

Then schedule 1 part two, which is another important thing, then in certain cases, biomedical waste is generated in the household for example, some patients are there inside house or for some deliveries happen inside house. So, some, you know some waste is generated within the household. So, in that case, the responsibility of the generator or the household is to segregate waste and then hand it over in separate bags or containers to the municipal waste collectors. So, that is where the ULBs getting involved.

Now, the municipal waste collector or the ULB you can say in this case, they can have a tie up with a common biomedical waste treatment and disposal facility like over here. And the these guys these people can come with their own vehicle and they can pick up the waste from either the Material Recovery Facility or even directly from the household and then they can take it waste for proper treatment in that facility.

So, usually the biomedical waste treatment facility you have a collection system or some a group of vehicles which will go and visit different facilities for waste generator or biomedical waste generator and pick up the waste from those particular points, but this is what different hospitals, but in case there are some waste is generated in the household level and there is a request to your collect that they can also come and do that. But usually, this is handled by the ULB, they can keep it separately in the Material Recovery Facility. And from there, this agency can come whichever these guys are tied up with and they can come and they can collect the waste from there itself.

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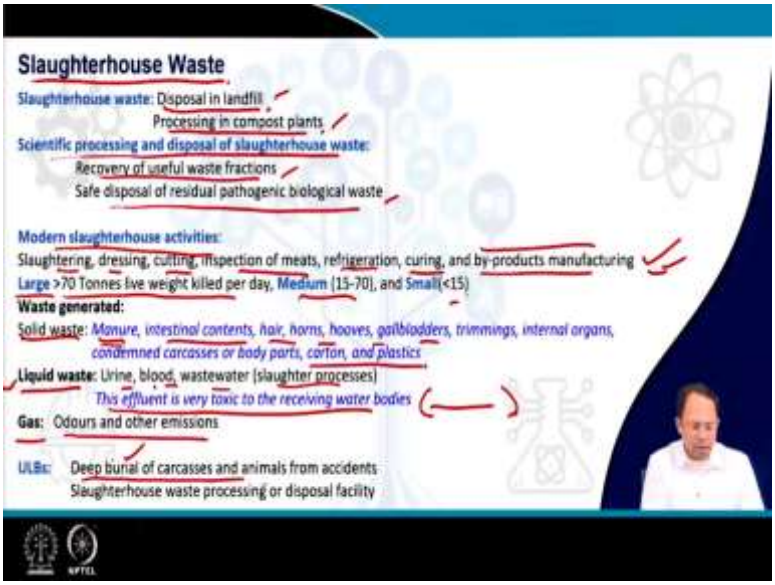

Now, next we will talk about slaughterhouse waste. This is another waste that is generated in urban areas, but we have to be careful about it disposal, it is a special waste. So, usually we dispose this waste in landfills. And the other is we can also process it in compost plants, not all kinds of slaughterhouse waste could be processed in compost plants, but these are the two options for final processing and disposal. So, either we process it in compost plants, or we can finally dispositive landfills.

Now, before we even go into disposal, we need to scientifically process and of course dispose the slaughterhouse waste. Now, we have to first reduce the quantity of slaughterhouse waste that is being generated. So first, we have to recover as much amount of waste that we can recover from that particular waste and make it into usable materials within the slaughterhouse itself. And finally, safe disposal of residual pathogenic biological waste has to be taken up. So first is recovery and then finally, disposal of the material because these are contaminated material.

Now, modern slaughterhouse activities not only include just slaughtering, it includes slaughtering, dressing, cutting inspection of meats of different sizes, and for different purposes, refrigeration may be storing, curing, and by also manufacturing of by-products. This is very, very important. That means not only the meat is being produced, but we can process the remaining material and we can create a lot of by-products that overall reduces the total quantity of waste that is being generated.

Now, there could be large slaughterhouses, which processes more than 70 tons of lightweight killed per day or media wants 15 to 70 and small ones which can process less than 15 tonnes of lightweight killed per day. So, that is what how we can designate them. And the waste generated from slaughterhouse are of three kinds, solid waste, liquid waste and gas of course. Now, solid waste are the manure like for example, you have a chicken poultry. So, of course, you feed them and then a lot of this waste material from the excreta of chickens and all that has been produced. So, that is we can use it as manure years and so on.

So manure, intestinal contents, hair, horns, hooves, gall bladders, all the different components as well as different cartons and plastics that are replaced by this facility. The liquid waste is urine blood wastewater, wastewater is utilized in the different slaughter processes slaughterhouse processes, but this blood is because of this culling blood is there and urine and other waste materials also is there because these are (())(23:28). This effluent this all gets mixed together if you do not process it, this effluent is very toxic to be received directly by water bodies. So, we need to have some amount of effluent treatment for this kind of waste.

And finally, gases odours bad odours can be generated other emissions can also happen, but usually we are more concerned about treating the liquid waste and the solid waste to reduce it before it goes into the landfill site. Now, the ULB can handle this waste, it can it can go for deep burial of the carcasses and animals also there are a lot of carcasses from accident like

animals which dies in accidents and so on. So, they should be buried deep so that they are not dug up by other animals for you know, for eating or something you know, in other dogs and all can dig up that waste and they can eat from that. So, to prevent that we can go for deep burial and slaughterhouse waste processing or disposal facility also could be considered.

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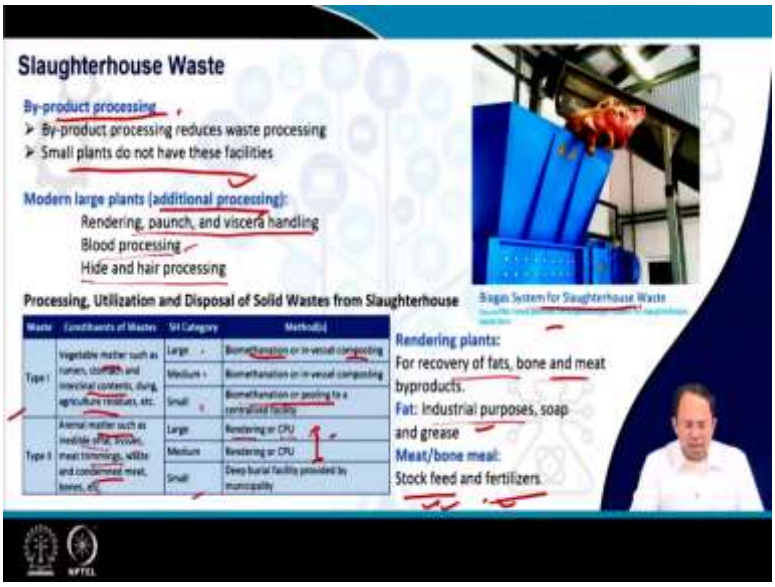

Now, one of the primary materials is like, as you can see over here is this is a biogas system which is generated from slaughterhouse waste. Now some of the by-products which we get from slaughterhouse waste, such as a by-product usually small facilities will not have any by-products. They do not have that kind of setup but large facilities, we can have other processes where by-products are generated. So, where that means these by-products are produced via additional processing. So, these processes are known these some of these are rendering, paunch and viscera handling, the other is blood processing, the other is hide and hair processing.

So, the hide the you know the skin and this hair is being processed for production of leather and other materials that initial processing is done and then they could be sent to those leather tanneries and so on. Blood can be processed for some uses and all, rendering, paunch, viscera handling these are processed means further processing the remaining matter after taking out the meat so that we boil those rendering is like we can boil that material and we can recover the fat, bones and we can generate some sort of by-products.

So, the fat is used in industrial purposes soap and grease production and so on. Whereas meat, bone and all this the remaining ones can be used to generate stock feed and also for

fertilizer production, stock feed is the material that is used to feed the animals themselves, and then also for fertilizer production. So, the different kinds of utilization of slaughterhouse waste you can see in this particular table this is from against (())(26:21) guidelines. So, type one is like mostly vegetable matter, romaine stomach and intestinal contents dung agricultural residues. So, as you can understand, again, there are different categories small, medium, large, different kinds of slaughterhouse categories.

Now, as you can understand this is suitable for composting. So, we can either go for bio methanation, or composting in vehicle composting, sorry in vessel composting. So, same is there and if it is a small plant, then what happens we can do one common bio methanation or centralized facility where all these could be collected from different plants and then we can process this kind of waste.

The type two waste is animal matters such as inedible oval tissues, meat trimmings, waste stream condensed condemned meat bones, so on. So, either we can go for rendering and or we can go for this condensed you know, unit where we can actually you know, after the boiling happens in rendering, we can generate this you know we can separate the fat we can have this we can create feedstock and all and then the rest of the matter is condensed and then the effluent is generated which has to be treated.

So, this can be also done for large and medium plants, for some for small plants and all its we cannot have such kind of facilities because this can only be there in only large plants, because these are additional processing that requires a lot of space a lot of other technologies. So, in smaller plants, the contents that come out of this this kind of facilities, small slaughterhouses, we can take them for deep burial provided by the municipality.

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Then coming to e-waste, this is these are the other kinds of special waste as we all know that in India, the quantity of e-waste is growing very fast. And because we are growing, we are using more amount of your electronics and electrical material. So, the rate is something around 10 percent per annum and to certain estimates that are there in 2012 estimate it was around 0.8 million tonnes of waste which is this estimate was done by a central pollution control board in India.

Now, big problems with e-waste is people are not aware neither are the generators or ULBs are aware of how to deal with this kind of waste. So, there is a lot of capacity building that is required in this particular domain. Then the total general the capacity to deal with this kind of is there may be one or two recyclers which can deal with this waste, but we require more and also the processes are informal, they are dirty. So, as you can see in this particular image, even though this is not from India, but still this is informal. So, you know there is no standard way to do this kind of recycling. So, this has to be looked into.

E-waste is segregated from the municipal waste stream and sent to authorize dismantles or recyclers, but we require more of them. And usually, extended producer responsibility is a big way to handle this kind of waste, because the ones the companies which produce that particular waste is the best people to actually deal with this kind of waste. So, how to manage the end of life of this particular product is best dealt through extended producer responsibility.

Now, there are two categories of waste category one and category two, the category one is IT and telecommunication equipment waste, whereas category two is consumer electronics and electricals that are utilized in houses. And you as you can see television sets, then LCD you know LCDs and other kinds of television sets, refrigerators, washing machines, air conditioners, and so, this kind of material is handled by this category.

Whereas, centralized data, computers, then personal computing laptops, then notepads, then printers, cartridges, all these things telex, telephones, cordless telephones all this thing could be handled under category one waste and they can have separate recyclers and this can go for other recyclers.

Overall, the data a lot of hazardous and non-hazardous material present in this kind of e-waste and rough estimates are there around 50 percent is ferrous metals, 21 percent is plastic and these are mostly not recyclable kinds of plastic. So, if you melt them that they will lead to a lot of emissions and all the non-ferrous metals such as copper, aluminium, silver, gold, platinum, which is comes to around 13 percent and other components such as glass etc are at around 16 percent.

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Then coming to waste tyres. So, this is a big challenge for ULBs, because of that niche, the shape of this particular tyre, we have this particular material like you can see that if you want to dispose that you have to shred it, and then make it into smaller pieces, and then put it in the landfill site because otherwise it will stick out of the cell that that landfill cells where you will put this.

The other thing is this kind of use this kind of waste is also difficult because the transport process it is difficult to carry and so on. So, because of the shape and size of the tyres it is difficult to handle it is also weigh the weight is also there. It is made of, tyre is made of complex natural and synthetic rubber compounds which have got high calorific value and, and also other materials. So, these are the primary constituents of a tyre.

And what you will see is because these are a high calorific value, when these are stored, then suddenly there is some spontaneous combustion also happens sometimes it is easy to catch fire and this fire is difficult to bring down these are tyre fires are very difficult to be handled by fire services, then usually you will find them in urban areas, these are illegally taking up areas of the footpath by some agencies which actually handle this kind of waste or like tyre shops and all these things where this kind of tyre you know change happens or not.

And sometimes it is dumped in some plots and all. Then because the tyre has got some inner layer, inner area as well this can be breeding grounds of disease vectors, a lot of mosquitoes are breeding inside tabs in the water that gets captured in the tyres within that water a lot of water and this is a cause of malaria and dengue in India.

A lot of insects and other animals can also breed in this particular spaces. So, this these are very discreet sort of problems in urban areas. So, there are different reuses for use tyres and you always can facilitate that, for example, rethreading of tyres that means over here you can see the tyre is being retread that means the tyre is made of you know this kind of natural and synthetic rubber.

So, that means they gradually wear off after time. So, we can put an additional layer of rubber at the top. So, that we can this process is known as retreading so that we can reuse this tyre again retaining walls for hill roads. So, we can cut this tyres make it into large pieces and they can help in retaining the walls or you know the sides in case of hilly areas the roads and as you know the profile the slower we can retain, they can access retaining walls for this particular hilly roads.

Then erosion controls along drainage channels. So, we can lay them around drainage channels so that they reduce erosion, they can act as coastal barriers for the waves, they can act as crash barriers like over here, they are used as crash barriers. They can they are used in landfill construction, because they can they are they have certain weights they can be put on liner materials to keep them down. After that we will put on waste about that.

Then, the tyres could be cut into smaller pieces they were used for repair of shoes for making shoe soles, gaskets, conveyor belts, and it could be also utilized in automobile floor mats, wheels for handcart. So, these are reuse of the tyres. So, these are the different kinds of reuse which could be fascinated by the ULB as well.

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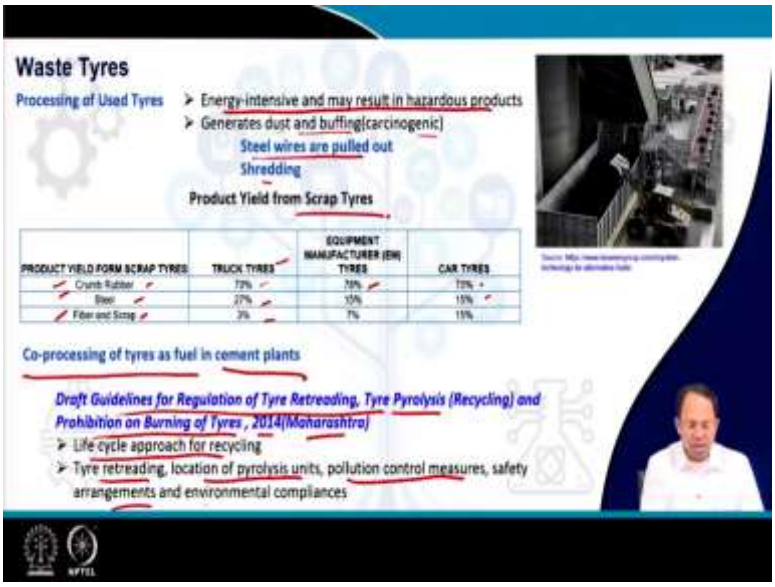

Now, we can if we cannot reuse them, we can get a process some of this also. We can. The processing is energy intensive, and we result in some hazardous products. Usually, when we when we do the processing a lot of dust and buffing is produced which is carcinogenic, the tyres have got steel wires which should be separated and then once the steel wires are separated then we can shred the tyres into smaller pieces. Now, from scrap tyres this is what we can generate like for example, we can generate crumb rubber, we can generate steel, we can generate some amount of fibres and scrap materials.

So, you can see for tractor tyres the rubber part is 70 percent whereas, for car tyre other equipment tyres these around 78 percent, steel around 27 percent and in truck tyres are 15 percent in car tyres and other tyres and fibre and scraps are 3 percent, percent and 15 percent. So, these are the materials which can be recovered which could be reused for or recycled for other purposes. What is this crumb rubber or some amount of you know once we shred the tyre, we can also use it for co-processing or generating energy or as fuel we can use it as fuel in cement plants or so, in that way we can also utilize this particular waste.

Now, there are no guidelines from the Government of India but there are draft guidelines for regulation of tyre retreading tyre pyrolysis and prohibition on burning of tyres has been

brought up by Maharashtra Government of Maharashtra for the in the year 2014. So, they have suggested life, following lifecycle approach for recycling for tyres and also, they have suggested tyre retreading location of pyrolysis units where we can burn this tyre, pollution control measures, safety arrangements and environmental compliances for this kind of facilities.

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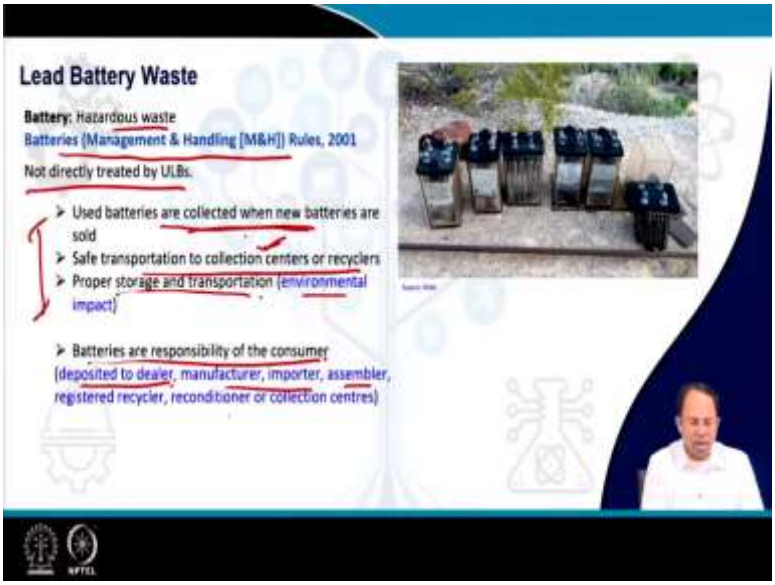

The final kind of special waste that we will discuss is about lead battery waste. So, usually this battery is a hazardous waste, and we have to deal it following the battery management and handling rules of 2001. And this is again not directly undertaken by the ULBs nothing processing of this kind of waste is not directly done by the ULBs, but used batteries are collected. Once if it is collected in the municipal waste stream, then it has to be segregated and then sent to the proper recycling or processing facility.

But other than that, used batteries are collected when new batteries are sold. So that is one way you can say extended producer responsibility is there for battery waste management. Safe transportation to collection centres or recyclers by you know, whichever company or whichever retailer collects this kind of batteries, they have to follow this.

So there has to be some setup of transportation system and collection centres and so on. So, again, this collection centres could be done by the company or the brands themselves which produce this kind of batteries, then proper storage and transportation so that environmental impact is not there. So, we have to design a proper transportation system similar to

biomedical waste, but again, it is not the responsibility of the ULB to design that transportation system maybe it can facilitate.

But primarily batteries are the responsibility of the consumer. After consumption of the battery or use of the battery, it should be deposited to the dealer or manufacturer or importer, assembler, registered recycler or reconditioner or collection centres.

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So, these are some of the references you can use.

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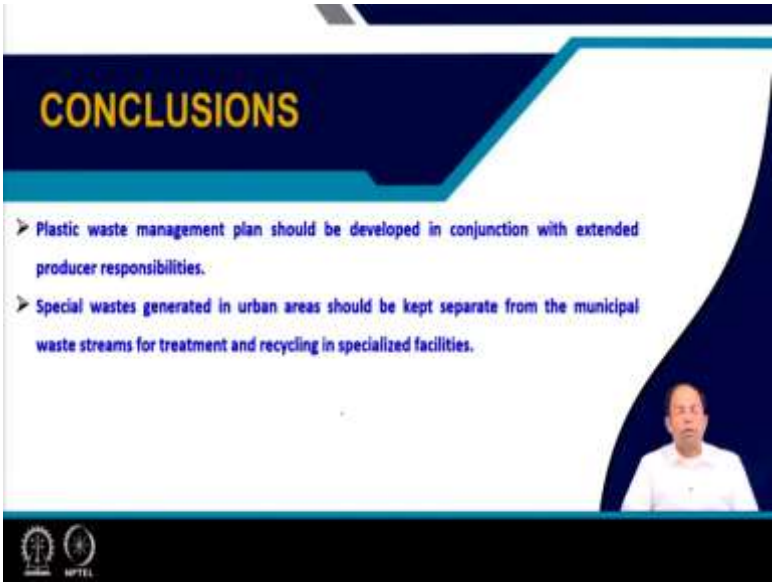

To conclude, plastic waste management plan should be developed in conjunction with extended producer responsibilities, and special waste generated in urban area should be kept separate from municipal waste streams for treatment and recycling in specialized facilities.