Urban Services Planning
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Lecture 60
Crematoriums and Burial Grounds

Welcome to the last lecture of this course, and this lecture will cover Crematoriums and Burial Grounds.

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The different concepts that we will cover are on crematorium and burial grounds, then the cremation, then we will talk about crematoriums, different kinds of crematoriums and then we will do a comparative analysis of different types of crematoriums and finally, we will also talk about burial grounds.

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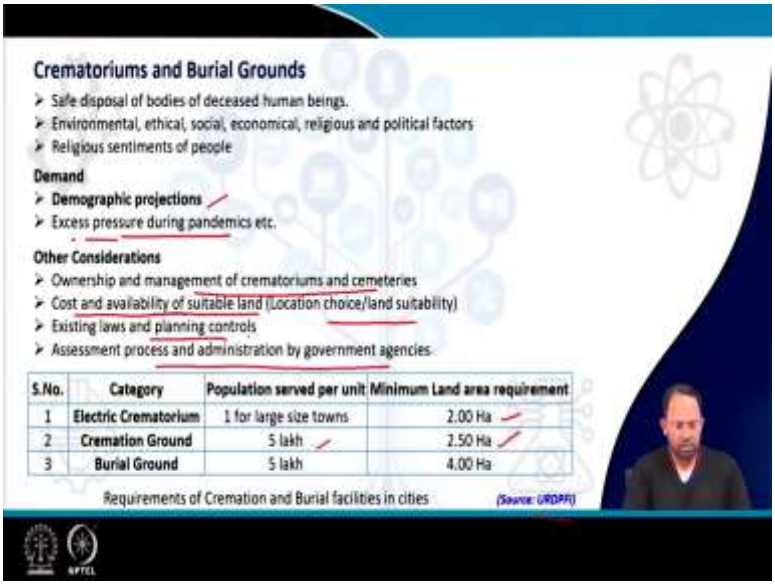

Now, Crematorium and Burial Grounds are there in urban areas so that we can safely dispose human bodies after their death. And usually there are a lot of concerns in regards to disposal of human bodies. There are environmental concerns, ethical concerns, social concerns, economical concerns, religious concerns and political concerns as well.

So, economical concerns are for example, burial grounds will cost money, crematoriums burning involves when you burn, when in crematoriums, when we cremate people, then we have to use wood and all or sometimes we can use gas. Gas crematoriums or electric crematoriums for that purpose, that cost money as well.

So, there are and then there are ethical issues, then there are social issues, then there are religious issues, all these things do govern the process of this final journey of people. Then religious sentiments of people is obviously very, very important different religious groups have got different rituals associated with the final process of final cremation or burial process, and those has to be respected and because people are grieving at this point of time, there has to be not only facilities for the actual cremation or actual burial, but what other ancillary facilities we have to provide spaces as well.

So, the demand for crematoriums and burial grounds are based on demographic projections of how much death is supposed to occur, but it also depends on the distance of that particular facility from the because if I have got facilities which are far away from the city, then it is difficult to travel there. So, all these issues also are considered, but also as we have seen during the pandemics, there is when the odd in certain cases when there is a lot of deaths

happening which is beyond the normal rate or the normal average, that how do I handle with those things. So, those also needs to be considered.

Now, other considerations in regards to this final process of disposal of human bodies, or deceased human beings is ownership and management of crematoriums and cemeteries sometimes it is private ownership, sometimes it is government ownership. So, that is one of the issues, then cost and availability of suitable land, location choice, land suitability, all these factors are there but as you understand that people do not want burial grounds or crematoriums near their residences.

So, cost and availability of suitable land do play is becomes very important in locating these particular facilities and existing laws and planning controls of that area has to be considered. And overall the assessment process and administration of this is done by several government agencies, those also needs to be considered.

Now, as per your URDPFI guidelines. It is pretty straightforward, which says that we require one crematorium for large town and the area minimum land area is required is for 2 hectares. Whereas cremation ground is required, like for every 5 lakh people, we need to have one cremation ground, which is where people burn their relatives in an open wood fire, that that space required is around 2.5 hectares, whereas burial grounds for every 5 lakh people, it is the space required is around 4 hectares.

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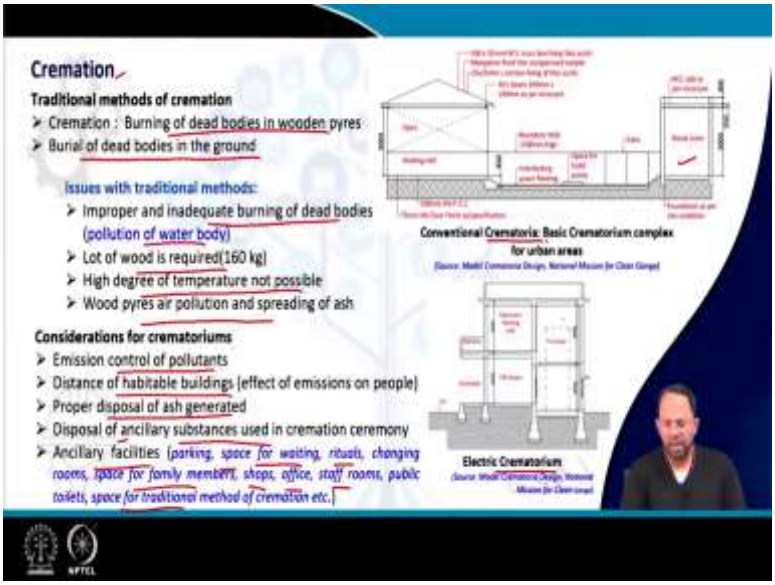

Now, the traditional method of cremation particularly when we talk about cremation, then the traditional method is burning of dead bodies in wooden pyres and or it could be burial of

dead bodies in the ground. So, these are the based on the different religious practices people will adopt these two basic processes.

Then, there are certain issues with traditional methods for example, improper and inadequate burning of dead bodies results in pollution of water body, lot of wood is also required particularly for cremation by burning and high degree of temperature is not possible. So, because it is a wood burning and so that leaves lot of advanced material as well a lot of other materials which pollute.

Then wood pyres creates air pollution and its ash spreads over the air in when there is a lot of wind it will spread far to faraway places as well. So, certain considerations has to be there for crematoriums one is emission control of pollutants, distance of habitable buildings, that is how far away the surrounding residential areas are, proper disposal of the ash that is generated, disposal of some of the ashes returned to the family, but most of it is disposed directly from the crematorium.

Disposal of ancillary substances used in cremation ceremony like other materials which get burned, ancillary facilities also needs to be provided such as parking space, space for waiting rituals, changing rooms space for family members, shops, office staff room, public toilet, space for traditional methods of cremation, so on.

So, you can see over here this is a conventional crematory design, where we have a waiting hall and you know open all probably burning happens over here then there is a wood store and then there is other places also where you know people can wait and so on. Whereas, this is the electric crematorium, where we have mourning waiting hall, there is this furnace actually where the body this is a two-level furnace that is provided and actually the body is put inside the furnace. And then you know, after that the rituals happen and all and then the body could be put inside the furnace.

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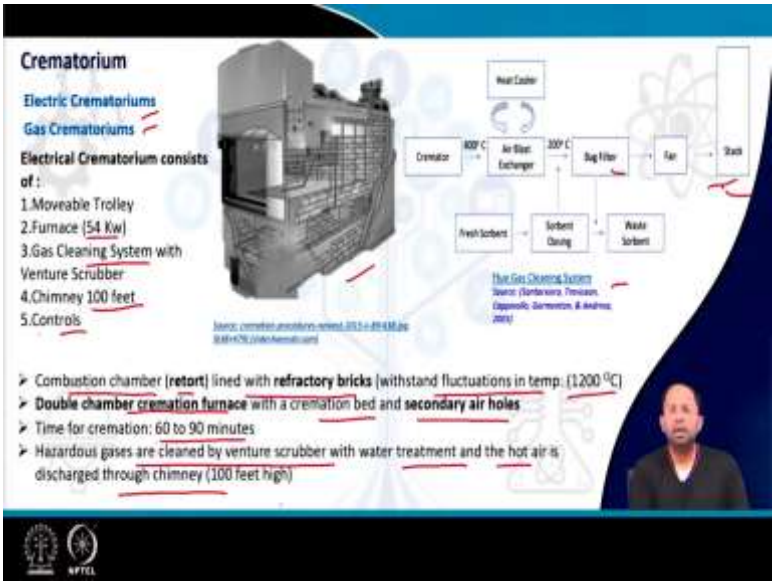

So, we can have two kinds of crematoriums, electric crematoriums and gas crematoriums usually both involves a moving trolley in case of electronic crematoriums there is a furnace of 54 kilowatts, then the gas that is generated after burning that needs to be cleaned and usually we use venture scrubbers for that, where it says the carbon is captured and the gas is washed and eventually the gas is released by a chimney which is at least 100 feet high.

And finally, we also have controls for the movement of the trays or control of the blowers or control of the furnace. So, this is a image of the one of the crematoriums or the furnace within the crematorium and the flue gas needs to be cleaned and once the gas is cleaned, it is released via the stack. So, usually there are fans which you know blows the air at the and the burning material and all these things are the gas is actually captured in back filters and finally, the smoke is driven using a fan to the stack.

The combustion chamber also known as a retort chamber is lined with refractory bricks, withstand temperature fluctuations to the extent are 1200 degrees centigrade. And usually there is double chamber cremation furnace. So, this has got 2 chambers, one at the bottom and top with a cremation bed and secondary air holes so that air could be blown and time of cremation is around 60 to 90 minutes based on different biological processes and matters biological matter it depends on the time varies and hazardous gases clean by venture scrubber with water treatment and the hot air is discharged with chimney which is 100 feet high.

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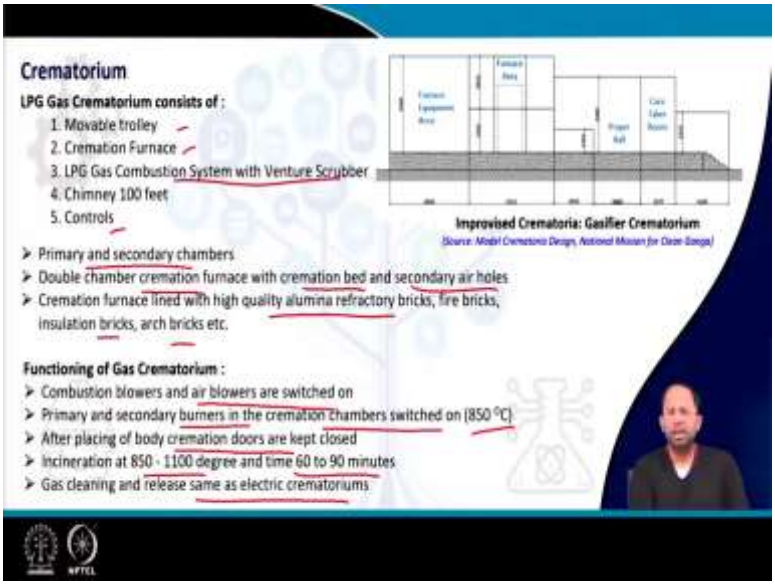

For LPG crematorium, more or less everything is same. We have a movable trolley cremation furnace, LPG gas combustion system with and then we have got venture scrubbers, the chimney and controls. So, in case of gas crematoriums, there is a primary and a secondary chamber instead of just a simple furnace and the furnaces is basically a double chamber furnace similar to the last one.

And the each has a cremation bed and secondary air holes and the furnaces lined with high quality alumina refractory bricks, firebricks, insulation breaks and arch bricks as well. The gas cremate, how it works combustion blowers and air blowers is first switched on, which blows air and primary and secondary burners in the cremation chambers are switched on which helps to achieve at around 850 degrees centigrade.

And then the body is placed for cremation doors are kept closed. It the temperatures reaches around 850 to 1100 degrees and it takes around 60 to 90 minutes for the cremation to be completed. Finally, gas cleaning has to be done and finally these are released which is similar to the after cleaning it is really similar to an electric crematorium.

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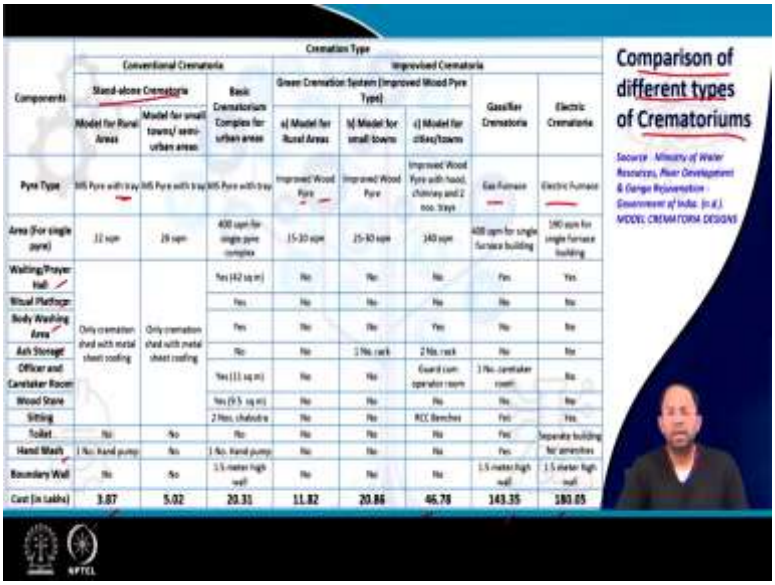

So, this chart gives a comparison of the different types of crematoriums, so these are standalone crematoriums or standard crematoriums where this normal wood is utilized. So, over here you can see the different kinds of the cost of the each of these crematoriums over on this side you can see this some improved designs are being discussed, as well as gas furnace or electric furnace crematoriums are also discussed, the different kinds of facilities that are required prayer hall, ritual platform, body washing area, ash storage, officer and caretaker room all these things are also given.

So, each require certain spaces and also overall boundary walls are also given, facilities for toilets, hand wash, seating areas these are also given. So, this you can go through this particular chart and determine that what sort of area is required for a crematorium. And roughly you can say that the costs are also given. So, this gives you a rough idea about how much money is required to set up this kind of crematoriums as well.

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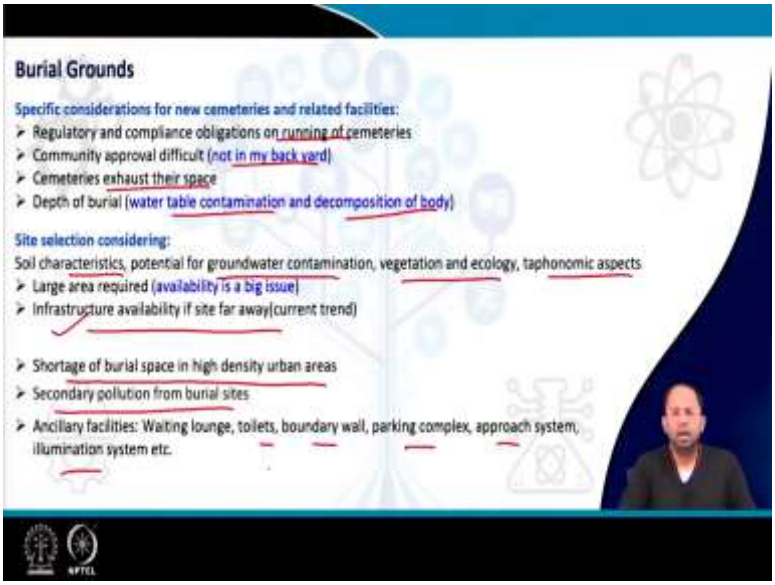

So, finally, coming to burial grounds, there are certain other considerations for cemeteries that has to come up in urban areas. So, first of all, there are several regulatory and compliance obligations for running of cemeteries and community. First of all, based you know not in my backyard, reasons people do not want this kind of facilities to come near their houses.

So, there is getting approval from the community is difficult. So, existing cemeteries are fine, but for new cemeteries this is really difficult to get permission for this, then cemeteries most of the cemeteries are exhausting their spaces because of the populations pressure and there has to be adequate depth of burial because people are reusing the same spaces for burying.

So, but there has to be adequate depth for burial, so that there is no water table contamination and the decomposition takes place smoothly. So, site selections are for new cemetery are done considering soil characteristics of that area, potential for groundwater contamination, vegetation and ecology and taxonomic aspects, which is related with the body's decomposition and bones and all this.

So, usually a large area is required for a cemetery, which is also a big issue, because we do not get this kind of large areas in urban areas. And then infrastructure availability in case of people are mostly in most countries or in many cities, people are now setting up new cemeteries far away from the main core urban area. So, this is because it is far away, infrastructure availability also becomes an issue.

And usually, right now, we are running there is a lot of shortage of burial space and also the money charged for burial spaces also very high. So, it is very difficult for many people to

adopt that. Then there is a lot of secondary pollution from burial sites. And ancillary facilities are also requires for this kind of burial sites such as waiting lounges, toilets, boundary wall, parking complex approach system, illumination system and so on.

So, this overall we can say that, in India burial sites, each person requires around 15 square metre 15 square feet of area, the price varies from 15,000 to even something around lakhs of rupees depending on where you want to bury your near and dear ones, if it is near your the core the religious prayer area, then the more nearer to that area it is it would cost more amount of money. So, spaces are difficult to get. So, these are the issues that are primarily being faced in regards to burial grounds.

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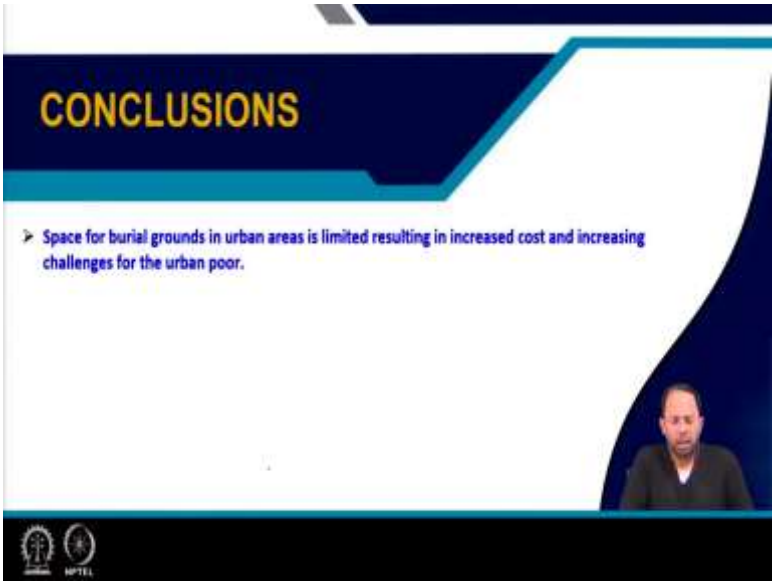

So, these are some of the references that you can study. To conclude space for burial grounds in urban areas is limited resulting in increased cost and increasing challenges, particularly for the urban poor.