Ethics in Engineering Practice
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Lecture – 03
Introduction to Ethical Reasoning and Engineering Ethics (Contd.)

Welcome back. We will continue our discussion of the theories and it is application in the ethical decision making. In today's session, we are going to take a particular cases, and we will try to see how we apply the utilitarianism rights and duties ethics, and in virtue ethics and how a single problem if taken a viewed from different perspectives and different interpretation. And which do we take care of which we will do like prioritize one theory over the other and how do we answer the problem. So, let us see.

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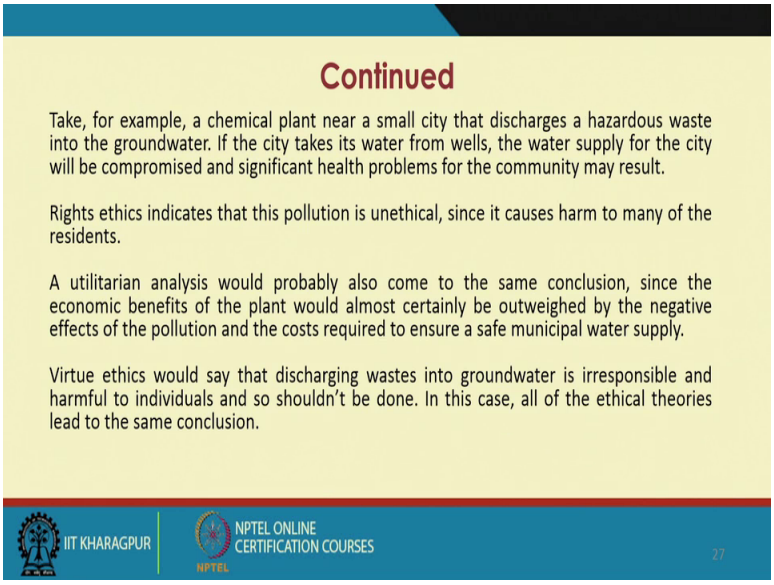

We will take it for an example chemical plant which is near a small city that discharges a hazardous waste into groundwater. So, please note it is a chemical plant near a small city that discharges the hazardous waste into the groundwater. If the city takes it is water from wells the water supply for the city will be compromised, and significant health problems for the community may result.

So, when we talk of the rights ethics, it indicates that this pollution is unethical, because it causes harm to many of the residents. And these residents have the right to maybe a safe drinking water. A utility analysis would probably also come to the same conclusion,

since the economic benefits of the plant would almost certainly be outwitted by the negative effects of the pollution and the cost required to ensure a safe municipal water supply.

So, when you are going from the cost benefit analysis it written in perspective, there also we see like the whatever economic benefits that the plant is going to bring in, but the cost that will get involved in terms of the social cost of the pollution or the cost involved in getting a safe; like, water supply by the municipality will be much more and it will outweigh the benefits which this plant is going to bring.

Virtue ethics would also say that, discharging waste into groundwater is an irresponsible act, and it is harmful to the individuals and should not be done. In this case, all of the ethical theories will lead to the same conclusion, but sometimes these type of solutions; but sometimes these types of solutions may not happen also where all the theories are pointing towards the same conclusion. If this happens like, all the theories are coming to the same conclusion, then it is a very welcomed situation, and we know like we are really taking a decision which is ethical theory based, and which is supported by all the ethical theories, and there is no dilemma about it. But, sometimes it may so happen like these all the theories may not be pointing towards the same end conclusion. And there starts again the decision and dilemma which is the theory that we are going to choose which is the conclusion that we are going to choose and which is the conclusion that is what we may not be considering now. So, let us see about those problems also.

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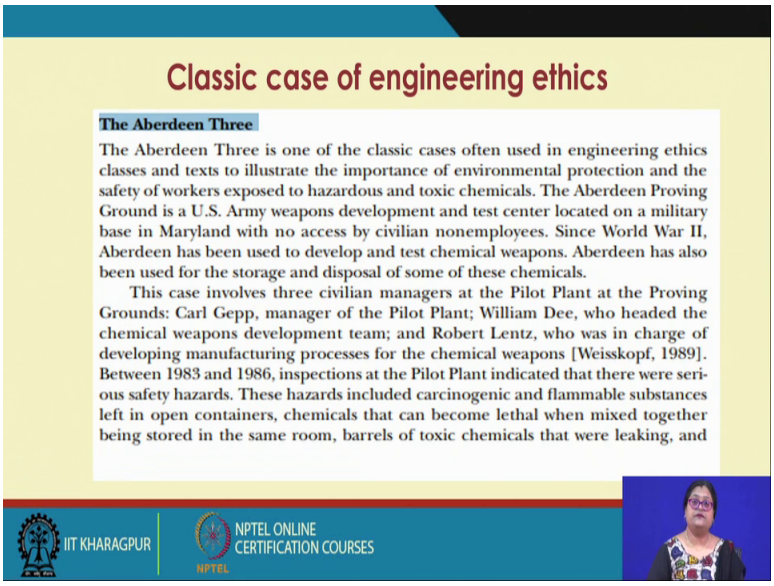

So, here we will discuss the case of the Aberdeen 3. So, it is a very classic engineering case which is often classic case discussed in engineering ethics classes and texts. To illustrate the importance of environmental protection and the safety of workers exposed to hazardous and toxic chemicals. The Aberdeen proving ground is a U S army weapons development and test center located on a military base in Maryland with no access by civilian non employees.

Since world war 2, Aberdeen has been used to develop and test chemical weapons. Aberdeen has also been used for the storage and disposal of some of these chemicals. This case involves 3 civilian managers at the pilot plant at the proving grounds. Carl Gepp manager of the pilot plant, William Dee who headed the chemical weapons development team, and Robert Lentz, who was in charge of developing manufacturing processes for the chemical weapons.

Between 1983 and 1986, inspections at the pilot plant indicated that there were serious safety hazards. These hazards included carcinogenic and flammable substances left in open containers, chemicals that can become lethal when mixed together being stored in the same room; like, and there were barrels of toxic chemicals that were leaking and unlabeled containers of chemicals.

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There were also an external tank used to store sulfuric acid that had leaked 200 gallons of acid into a local river. This incident triggered state and federal safety investigations that revealed inadequate chemical retaining dikes. And a system for containing and treating chemical hazards, that was corroded and leaking. In June of 1988, the 3 engineer managers were indicated for violation of RCRA, that is the resource conservation and recovery act. RCRA had been passed by congress in 1976 and was intended to provide incentives for the recovery of important resources from wastes.

The conservation of resources and the control of disposal of hazardous waste. RCRA banned the dumping of solid hazardous waste, and included criminal penalties for violation of hazardous waste disposal guidelines. The 3 managers claimed that they were not aware of the plant storage practices were illegal. And that they did things according to accepted practices at the pilot plant.

Interestingly since this was a criminal prosecution the army could not help defray the cost of the manager's defense. And each of them incurred great cost defending themselves. In 1989 the 3 engineer managers were tried and convicted of illegally storing, treating and disposing of hazardous wastes. There was no indication that these 3 were the ones who actually handled the chemicals in an unsafe manner, but as managers of the plant the 3 were ultimately responsible for how the chemicals were stored and for the maintenance of the safety equipment.

The potential penalty for these crimes were up to 15 years in prison, and a fine of dollar 750,000. Gepp Dee and Lentz were each found guilty and sentenced to 3 years' probation and 1000 hours of community service. The relative leniency of the sentences was based partly on the large court costs each had already incurred. So, based on this case what we can see there are different layers of this discussion. What we can see from there are different parties involved in it, different stakeholders involved in it, and first is like the pilot plant, second is the way that the chemicals are stored.

Third is where the environment is getting affected the 3 persons who were taken to be responsible for the unsafe maintenance. And, they are like rights for defending themselves respected not respected also. So, and also if we look at from the virtuous level there is also a different layer to it. So, if we go back to the case from the start. So, if we go back to the case from the start and we try to see it. So, what we find over there is the if you go step by step like, we find over here that this weapon development ground and test center located on a military base in Maryland, it had no access by civilian non employees.

So, people the larger society, the Gepp did not know the civilians like how actually things are getting done inside the plants. So, there is no information regarding that, because it is we which had no access by civilian non employees. Since World War II Aberdeen has been used to develop and test chemical weapons, Aberdeen has been used for the storage and disposal of some of these chemicals also. But, how things were processed inside? And how it was going on where the due processes were followed were not is also not know.

So, this case involves 3 again civilian managers at the pilot plant at the proving grounds. So, these are Carl Gepp, manager of the pilot plant William Dee who headed the chemical weapons and development team and Robert Lentz was in charge of developing of the manufacturing processes for the chemical weapons. So, between 1983 and 1986 inspections at these plants indicated they were serious safety hazards, and the other hazards were listed over here.

Question comes over here, who is responsible for this hazard. If we are going by the utilitarian perspective of like the cost which is accrued which comes and the harm which comes to the society at large by the unsafe processes followed in the particular

organization. And the may be irresponsible act of these people in how things were stored or not. And the benefit that they get from storing the things in a very unsafe way or not following the processes and the cost that someone has to pay with respect to the safety hazards, which is related to the majority of the people the environment at large.

Then from the utilitarian perspective, we can say like yes these people have responsible, and it is the cost is much more cost the social cost of their action is much more as compared to the benefits of their action that is maybe time saved or money saved by not followed the proper processes of storing things safe processes. And it is a correct decision for like the to hold themselves as responsible for these actions and unsafe actions and charging penalties on them.

But again, if we go by the rights perspective and duties perspective, if you see like going for this by this discussion over here, like in June of 1988 the 3 engineer managers were indicted for violation of RCRA. And so, this part where the 3 managers are claiming that they were not aware that the plant storage practices were illegal and that they did things according to the accepted practices of the pilot plant.

So, this is what happens it is again right of the person 2 of these people to tell about their ignorance, or to tell like these are like they did not know like they are these were the processes, they did not know like these are stored in an illegal way, and they did what they were things were done according to the accepted practices. But, that does not like answer their question for the corresponding duty of if they did not know like it was illegal, then why did not they ask for it where they unaware of the RC Ra act.

If things were done in a not following the guidelines of RCRA what stopped them from like telling about these things, why did not they like sound about like the unsafe processes and these things. Because we know as the engineers the primary duty of an engineer is to look into the safety measures of the public at large, the environment at large and to report about any hazardous activities taking place.

So, here again when you see like according to rights they may have told like, it is their right to like save themselves and claim for their ignorance and tell like we have followed the practice which is generally there. But maybe they have not done their corresponding duty of getting to know the correct facts, and reporting any discrepancy which they have noticed.

But again that we see over here, when you go for this line, like interestingly this was a criminal prosecution the army could not help defray the cost of the manager's defense. And each of them incurred great cost defending themselves. So, here maybe again, if we think to some extent, their right to get a support from their organization by virtue of being employees of a particular organization was not respected and the army could not do it is corresponding duty towards the employees for paying for their defense.

So, the when you are talking of the corresponding rights and duties of the employer and the employee, and whether this rights and duties were like executed in a proper way, maybe this is where because these people are civilians and they were army and this was a criminal prosecution. Due to this policy level discussions or discrepancies these rights and duties the employer and employee rights and duties have not been honored in a proper way.

So, in 1989, the 3 engineer managers were tried and convicted of illegally storing treating and disposing of the hazardous waste. There was no indication that these were the ones who actually handled the chemicals in an unsafe manner. But as the managers of the plant the 3 were ultimately responsible for the chemicals were stored and for the maintenance of the safety equipment.

So, this line is important is; we cannot tell like this is not a part of our duty responsibility because, the primary duty of the engineers are to ensure the safety of the public at large to reduce occurrence of hazardous incidents and happenings. So, even if they have not done things directly, but because they are managers so, they have to worn up these responsibilities for this unsafe acts.

The potential penalty for these crimes were up to 15 years in prison, and a fine of up to dollar 7,50,000 Gepp Dee and Lentz were each found guilty and sentenced to 3 years' probation and 1000 hours of community service. The relative leniency of the sentences was based partly on the large court costs each had already incurred. So, when it comes to the sharing of the pain and like, the harms and like, corresponding like maybe the when you took of take our duty to the convicted party.

So, because they have already spent a huge amount on the court cases, so, even if there was the it was a crying the potential penalty was for 15 years and up to dollar 7000 of is 7,50,000, but because here they have there was no evidence like they have directly

committed this. But being managers they have owned up the responsibility and so, and they have already paid for the harm to a great extent, though we cannot tell like it is equal to, but we can think of maybe an equivalent sharing of the pain by the court cases.

So, here the penalty was reduced to certain extent, and the it was probation and 1000 hours of community service to balance that part of the cost, and not to be unjust on the these 3 people. And that is where again the question of justice and fairness comes in. So, this is another theory which we talk of justice and fairness of the processes, involved whether the outcome is correct and also the process is correct when you talk of the procedural justice and when we talk of like the distributive justice.

So, the way that it was given and the amount that the penalty is given needs to be in a proper way needs to be a balanced way taking all situations into consideration to find out whether there is a fairness in the process, whether it is just or not, that is why it is called a process of justice. Whether it is taken to be distributive justice or whether it is taken to be a procedural justice. So, as far as distributive justice is concerned over here, it has been taken care of because, if you see the last line, like they have already spent something a large amount on the court cost. And so, they are like it has been balanced with the penalty in terms of like the community service and 3 years of probation.

If we talk of the procedural justice, yes. So, they had to own up the responsibility where it may be rights and duties have you know like give prioritized over the procedural justice and fairness of the processes, because see if we talk of like they were not there is no direct evidence like these people have very guilty then why they should be convicted this is not a correct process to do so.

So, then it will take the case will take a different turn, but if we take like it is a because by the position that they are managers. And it is a primary duty of the engineers to look into the safety issues of the public at large. So, whether or not they are directly involved in this unsafe processes. So, they have to own up the responsibility for it. Because it is a part of their major duty and they cannot say we have not done it. So, here duty overrides a other things other ways of ethical decision making.

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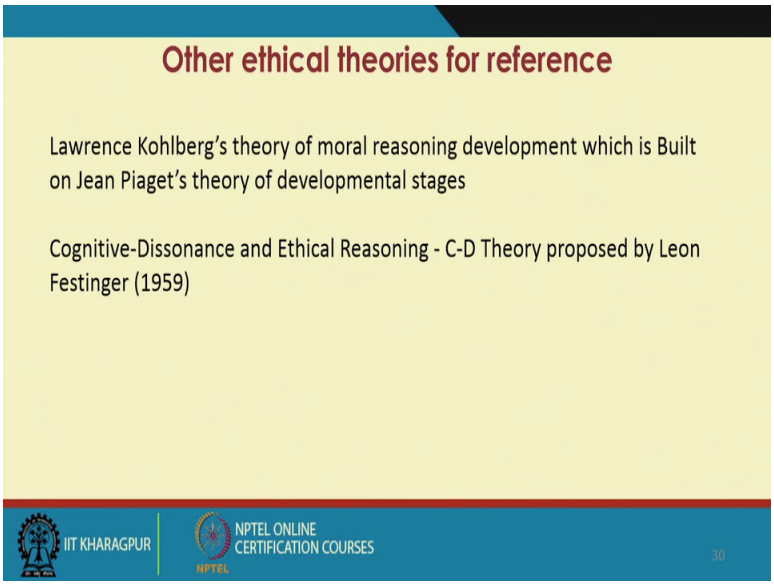

So, other ethical theories for reference are Lawrence Kohlberg's theory of moral reasoning development, which is built on Jean Paget's theory of developmental stages. And we have cognitive dissonance and ethical reasoning theory so, which is proposed by Festinger. So, these we will come back and refer I mean subsequent discussions as the lecture, progresses in many cases we will when we are talking about the decisions taken by the individuals and the dilemma faced in taking out decision when we discuss future cases we will come back to these theories.

Because, sometimes the decision taken by an individual depends on the stages of like what stage of moral development you have reached; how at how you can visualize a problem from the stages of moral maturity that a person has reached. And that is discussed by the Kohlberg's theory of moral reasoning of moral development. And which is the based on the development stage of the individuals as the individual progresses in life. So, how these moral reasoning develops, cognitive dissonance and ethical reasoning these are again issues of when you have ethical dilemmas and maybe if you have you are reasoning out your solutions for it.

And you find there is a dilemma in a dissonance in your 2 thought processes happening. And then how you try to solve for that and take a your ultimate decision. This is what is suggested by Festinger, and then there is a different like good path model for it. We will come back to this theory visit it again and again in our subsequent discussions, where we

will be dealing with more guesses. The in this course we will discuss at the end of each of these lectures, or maybe at the end of 2 3 lectures, this small cases, because until and unless we discuss about situations, and cases we will not be able to understand the dilemma the conflict of interest that is happening.

And how we can take a ethical decision based on these pillars of ethical decision making, how we can solve the ethical dilemmas based on maybe the stages of development that we are in our based on this cognitive disorders theories. Or maybe other theories that we are going to visit, and try to find out a solution to answer these dilemmas so that what we come to the conclusion is more or less beneficial to everyone to all the stakeholders which are connected. Thank you and we will see you in the next lectures.

Thank you.