

Ethics in Engineering Practice
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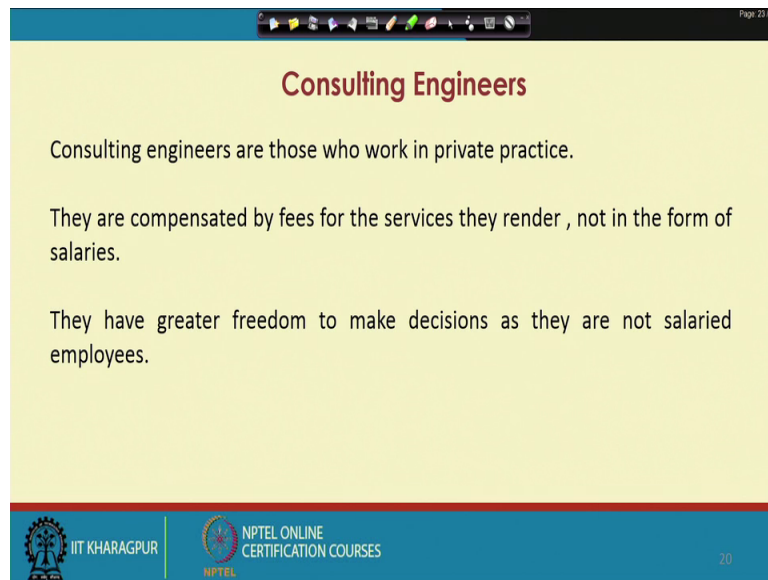
Lecture - 28
Engineers as Managers Consultants and Leaders (Contd.)

Welcome back. Today we will continue with the session of Engineers as Leaders, Managers and Consultants. In the earlier lesson we have learnt about the role of engineers as leaders and managers. Today we are going to focus on the role of engineers as consultants. And in the subsequent lectures we are going to focus on the like the moral values and who is the moral leader and engineers as moral leaders.

So, when we talking of leaders and consultants an engineer's role as leaders and consultants in the earlier class we have discussed about the role of engineers as managers. And there mostly we consider like, they are employees of certain organizations. And as a part of their organizational role they are taking up certain responsibilities in which they are indirect managing subordinates or like reporting to higher authorities. And in those cases many dilemma may be faced and with respect to the work, with respect to people management, with respect to the climate of the organization and how they are going to tackle it.

Today mainly we are going to focus on the role of engineers as consultants. So, when we are talking of consultants. Consulting engineers are those engineers who are in private practice. So, they are not employees of any organization, they are in private practice. And they are compensated for the fees the, fees that they get if they are compensated that fees comes for the services they render not but it is not in form of salaries.

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Consulting Engineers

Consulting engineers are those who work in private practice.

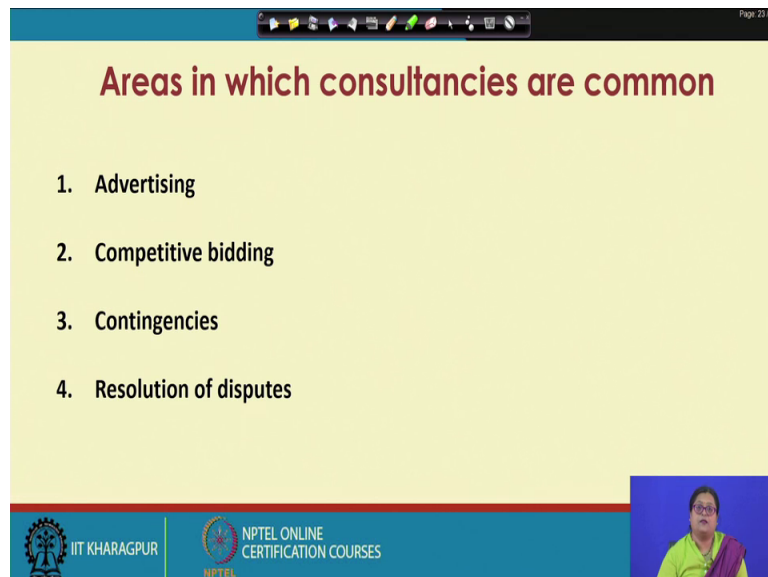
They are compensated by fees for the services they render , not in the form of salaries.

They have greater freedom to make decisions as they are not salaried employees.

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And also we find like they have a greater freedom to make a decisions, because they are not salaried employees. So, the primary difference from managers and the engineers that we are discussing about; it is like they are like, in private practice they are not direct employees of organization that give them a greater freedom of decision making.

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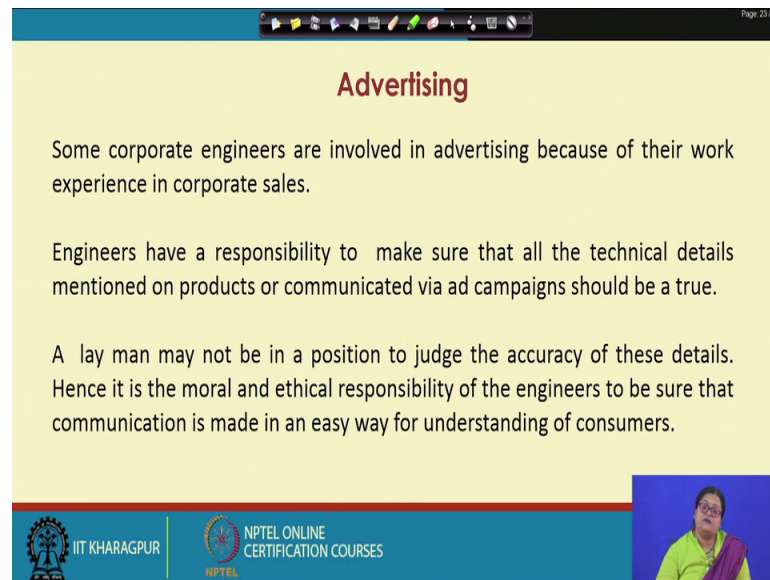
Areas in which consultancies are common

1. Advertising
2. Competitive bidding
3. Contingencies
4. Resolution of disputes

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So, we will focus into areas in which consultancies are common. And these are advertising, competitive bidding, contingencies and resolution of disputes.

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Advertising

Some corporate engineers are involved in advertising because of their work experience in corporate sales.

Engineers have a responsibility to make sure that all the technical details mentioned on products or communicated via ad campaigns should be true.

A lay man may not be in a position to judge the accuracy of these details. Hence it is the moral and ethical responsibility of the engineers to be sure that communication is made in an easy way for understanding of consumers.

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So, we will discuss each one by one starting with advertising. In advertising what happens? Some in some corporate engineers are involved in advertising because of their experiences in corporate sales. So, they have the responsibility to ensure that all technical details are mentioned on the products or communicated via the ad campaigns it should be true. So, why it is important? Because in advertisement it tries to a make a connection with end user beneficiaries and the way that connection is made, and how the communication is made it develops a lot of trust of the end users on the company and it is product.

So, it is very important that the engineers ensure like whatever technical details are mentioned in the products or in the communicated via ad campaigns should be true. So, lay person may not be in a position to judge the accuracy of these details. So, it is the moral and ethical responsibility of the engineers to be sure that the communication is made in a very easy way for the understanding of the consumers. The consumers may or may not have the technical expertise, and first and knowledge to understand the technical jargons so, if we tell something mentioned in the product.

So, it is the responsibility of the engineers to explain the qualities of the product in a very easy way to the end users so that they can understand it.

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It should be made sure that deceptive advertising is not done . This can be done in many ways like;

- By outright lies
- By half-truths
- By making false suggestions
- Hiding implications
- By creating ambiguity
- Through subliminal manipulation of the conscious

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One of the very important thing to take care off is that to ensure like nowhere at deceptive advertising is getting done. So, how (Refer Time: 05:57) when you talk about deceptive advertising, we then need to understand also what we mean by deceptive advertising or how it is created. Whenever we are talking about deceptive advertising it is a practice, where we are trying to mislead people towards taking a decision or we are trying to play with a belief of the person end user they trust of the end user on the company.

So, how if we understand, how deceptive advertisements are done? So, there are certain processes like, by telling outright lies about certain things where certain qualities are not there in your products, but your or certain things which you designed is not going to provide to, but you are trying to claim it. By half-truths not disclosing the total path may be only highlighting on the benefits not on the cost part of your design, and like as ours of using a products by making false suggestions.

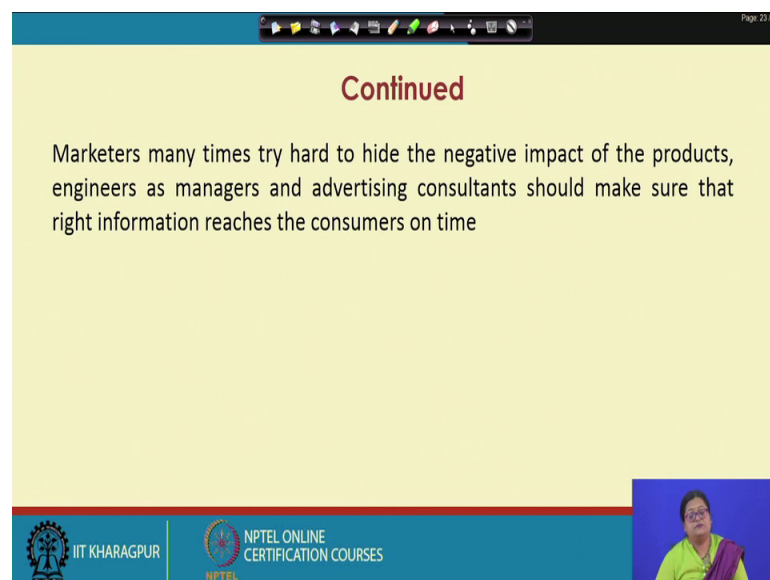
So, again giving certain alternatives which may or may not work, hiding the implication that is where you are telling like it is more goes like with the half-truth like you are may be focusing only on the like positive part of it, but you are not focusing on the or you are not letting people know about the negative part of your products.

So, by creating ambiguity. So, if you are not clear about the end users what the want, and if you not clear about the what your product is going to deliver, then in many cases what

happens is ambiguity is created like advertisement in the minds of the users so that they we will just think and make meaning based on their level of understanding of the benefits of the product. So, by creating ambiguity is one of the like qualities of deceptive advertising.

So, through subliminal manipulation of the conscious this is where you since an advertisement certain positive triggers at the at the subliminal level, or you sent some negative suggestions about your other competitors at the subliminal level, and that may affect the decision making at the conscious level, which may go for against the product. So, these are certain ways in which deceptive advertisement can be done.

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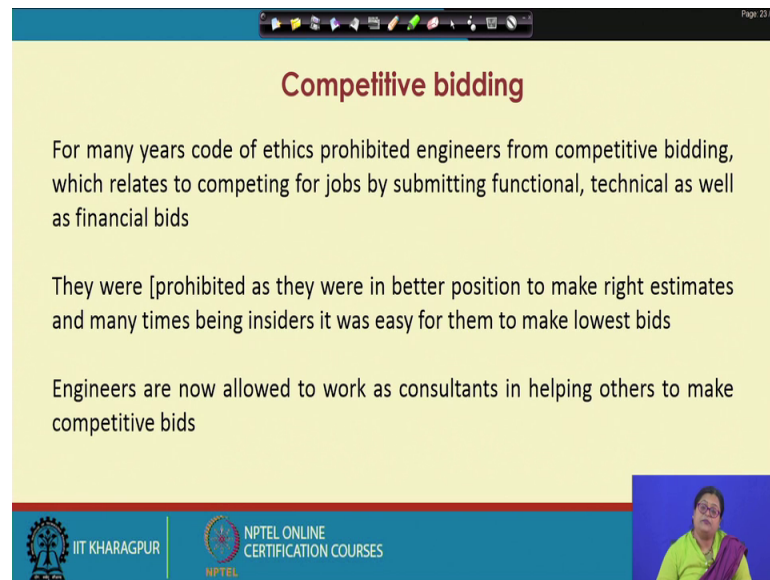
Marketers many times try hard to hide the negative impact of the products, engineers as managers and advertising consultants should make sure that right information reaches the consumers on time

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. So, what we happen as we are discussing is, very like we are generally focused towards highlighting on the positive aspect of the product, and in many cases the negative aspects are either hidden or played down. So, but those are very important points to be known by the consumers before they make a conscious choice of whether to go for the product or not to go for the product.

So, man marketers many times would happens; so, they try hard to hide the negative impact of the product. But engineers and managers and advertising consultants like should make it very sure like the right information reaches the consumers on time. Otherwise it may have a long term as it is health effects and other safety issues also.

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Competitive bidding

For many years code of ethics prohibited engineers from competitive bidding, which relates to competing for jobs by submitting functional, technical as well as financial bids

They were [prohibited as they were in better position to make right estimates and many times being insiders it was easy for them to make lowest bids

Engineers are now allowed to work as consultants in helping others to make competitive bids

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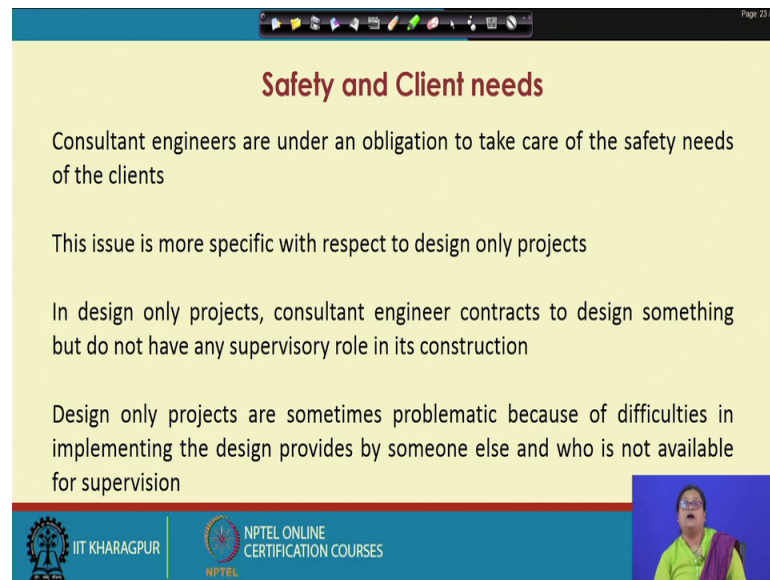
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Another important point is about competitive bidding, which talks about like the conflict of interest. So, in many years what happen like, the engineers where prohibited from competitive bidding, which relates to like bidding for a job by submitting functional technical as well as financial bids.

So, they were restricted in competitive bidding, because there is engineers because as experts in the profession, they were in a better position than lay mans to make the right estimates and many times being insiders it was like important. Like, it was easy for them to make the lowest bids. So, which could be a conflict of interest.

So, they were restricted from doing any competitive bidding a participating in competitive bidding. But now they are allowed to play the role of consultants in helping others to make the bids so that they are not generally directly bidding for it, but there we using their wisdom and knowledge of the industry, knowledge of the products to like act as consultants for the person who are bidding for it.

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Safety and Client needs

Consultant engineers are under an obligation to take care of the safety needs of the clients

This issue is more specific with respect to design only projects

In design only projects, consultant engineer contracts to design something but do not have any supervisory role in its construction

Design only projects are sometimes problematic because of difficulties in implementing the design provided by someone else and who is not available for supervision

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So, this is one area. Another important area where consultants have a major role to play is for the safety of the workers and client needs. Consultant engineers are under an obligation to take care of the safety needs of the clients.

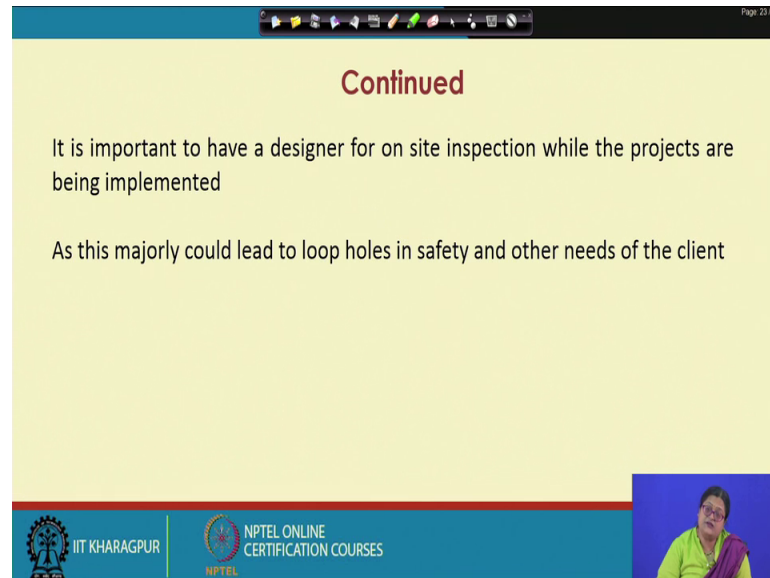
So, this becomes more important with respect to design only projects. So, why this becomes important? Because if we understand at here the engineers do not have any control on the end product and how it is used ultimately in design only projects consultant engineers are contracted to design something, because they but they do not have any supervisory role in the construction. So, they are sometimes problematic, because of difficulties in implementing the design which is provided by someone else and which is not available for supervision. So, if the design is given by someone that person must be having some idea of how it should be implemented and how it should be used what are the safety measures required to it.

So,, but this design only projects may be problematic because somebody one is designing and the other is implementing. So, and the person who is designing may or may not be available for like discussion or cross check. To see like, however he thought like it needs to be built, whether it is actually built in that way, whether the use that you have suggested is been the proper use in how it is getting used.

So, there is like no connectivity between these 3 facts as the someone else is as, there is no connectivity between these 3 facts as someone else is designed and somebody else is

looking at that design and try to do something and implement. So, there could always be a gap of knowledge between these 2 like engineers.

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It is important to have a designer for on site inspection while the projects are being implemented

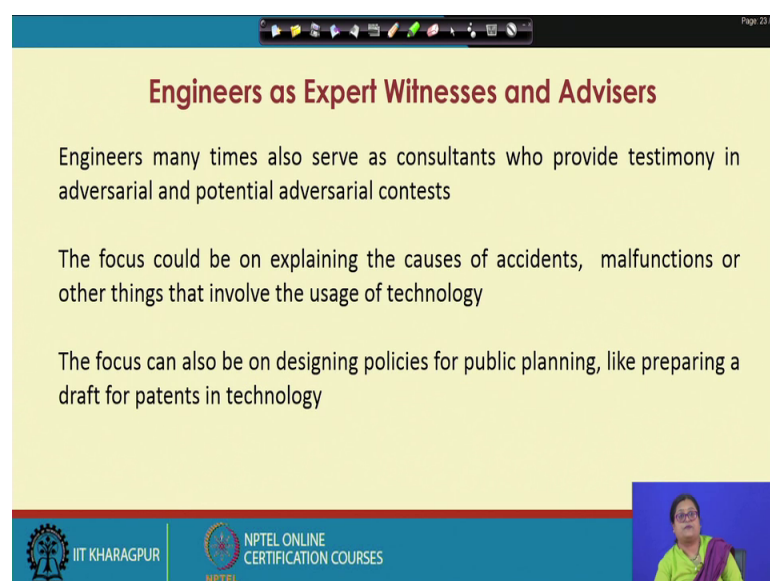
As this majorly could lead to loop holes in safety and other needs of the client

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So, because there is this gap or mismatch may happen, it is very important to have a designer for onsite inspection while the projects are being implemented. And so, this would help to like reduce the loop holes and to like because these could be when the safety issues. And try to take care of the other needs of the client.

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Engineers as Expert Witnesses and Advisers

Engineers many times also serve as consultants who provide testimony in adversarial and potential adversarial contests

The focus could be on explaining the causes of accidents, malfunctions or other things that involve the usage of technology

The focus can also be on designing policies for public planning, like preparing a draft for patents in technology

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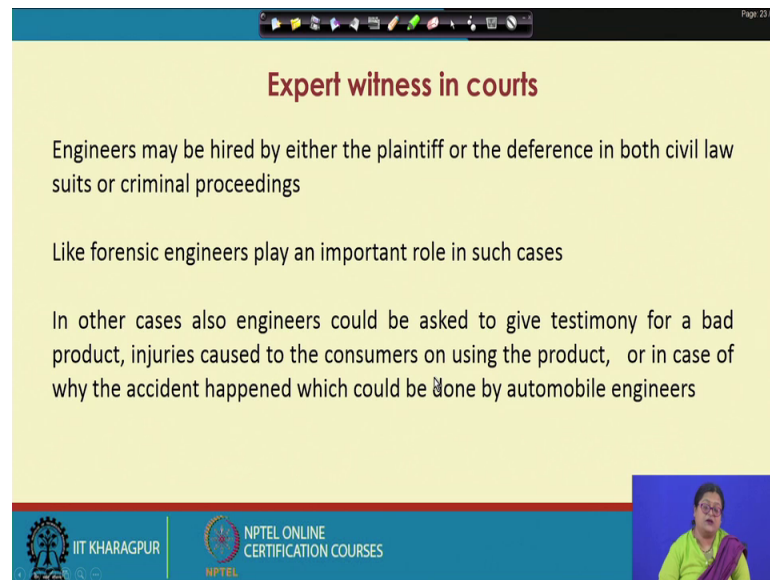
Another important role of consultant engineers could be engineers as expert witnesses and advisers. So, we understand like this being a job where people are involved with like greater resources man power. So, it may or may not happen, but still there are like situations, in which may be some accidents may happen, or somebody has filed illegal case. And then we are at last to understand how to proceed further, because we may not have the domain knowledge as the engineers to have.

So, they have a major role to play as witnesses and advisers. So, let us see like what are these role for expert witnesses. So, engineers many times also serve as consultants who provide testimony in adversarial and potential adversarial contest. The focus should be on explaining the causes of accidents malfunctions or other things that involve the usage of technology.

So, if you see over here; like, the their focus is on the causes of accidents malfunctions or other things that involve the uses of technology. Because it uses like involves the uses of technology and these are after effects of it, then engineer is there is an expert to find out what is the degree of firm provided by the nature of instrument that is being used. So, does it require to be changed, thus it require to be like revisited again what are the compensation to be paid and all. These are certain crucial decisions, which needs to be taken by the engineers. And so, sometimes they are taken to be as expert witnesses.

So, this is one of the role. Another role could be focusing on like designing polies for public planning like preparing draft for patents in technology.

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The slide is titled "Expert witness in courts" in red text. It contains three paragraphs of text. The first paragraph states that engineers may be hired by either the plaintiff or the defendant in both civil law suits or criminal proceedings. The second paragraph notes that forensic engineers play an important role in such cases. The third paragraph explains that in other cases, engineers could be asked to give testimony for a bad product, injuries caused to consumers using the product, or in case of why an accident happened, which could be done by automobile engineers. The slide footer includes the IIT Kharagpur logo, the NPTEL Online Certification Courses logo, and a small video inset of a woman in a green shirt.

Expert witness in courts

Engineers may be hired by either the plaintiff or the defendant in both civil law suits or criminal proceedings

Like forensic engineers play an important role in such cases

In other cases also engineers could be asked to give testimony for a bad product, injuries caused to the consumers on using the product, or in case of why the accident happened which could be done by automobile engineers

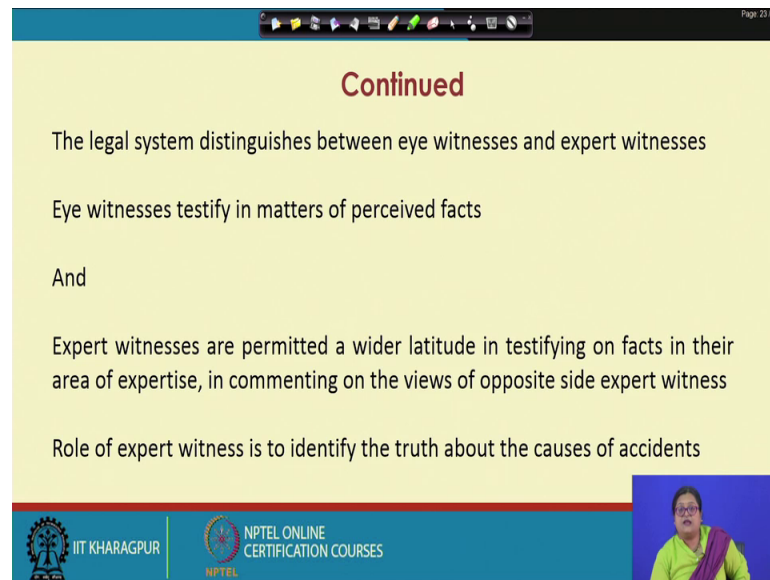
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One of this is of course, like we are talking of is the legal case; where somebody may have find something against your company or against your group and you need to be there as a expert witness. So, engineers may be here hired by either the plaintiff or the defendant in both civil law suits or criminal proceedings. So, you find like if there is a difference in both the civil law suits or criminal proceedings or like there is a difference between the 2 parties like engineers sometimes taken to be as expert witness.

So, while they are talking of witnesses here what happens? The general play the role of forensic engineers. So, engineers therefore, ask to give a testimony for a bad product, injuries caused to the consumers using the product, or in case of why the accident happened which could be done by automobile engineers. So, like if we taking of expert so, this is talking of your domain knowledge. So, injuries caused to the consumers using this product, or in case the why the accident happened. So, this could be done when we talking why automobile engineers means we are talking of car related accidents.

So now if you are talking of maybe you know bridge falling down and some deaths happening. So, in that case may be the bridge engineers are better experts in explaining the problem.

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The legal system distinguishes between eye witnesses and expert witnesses

Eye witnesses testify in matters of perceived facts

And

Expert witnesses are permitted a wider latitude in testifying on facts in their area of expertise, in commenting on the views of opposite side expert witness

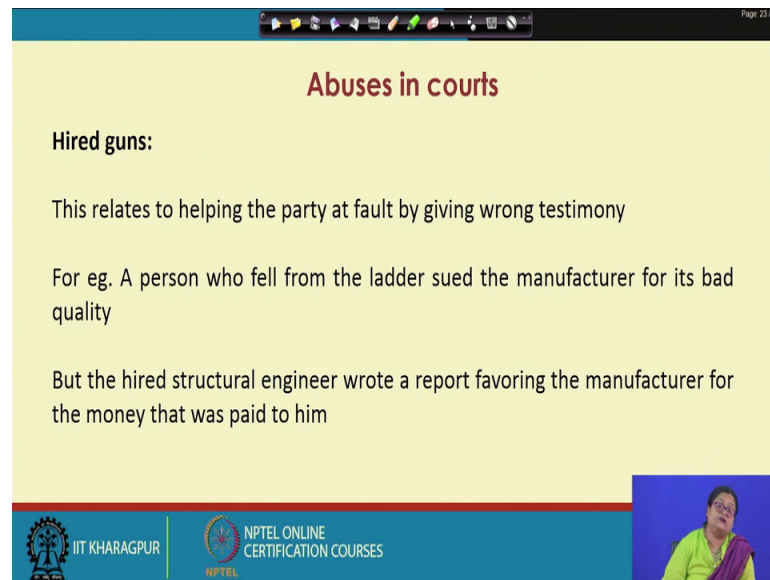
Role of expert witness is to identify the truth about the causes of accidents

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We have to understand before we proceed further like there is a difference between these two terms eye witnesses and expert witnesses. So, eye witnesses testify in matters of perceived facts. Expert witnesses are permitted a wider latitude in testing on facets in their area of expertise in commenting on the views of the opposite side expert witness.

So, in eye witness they are to report the matter as it is. Expert witnesses as a wider role they are more a sort of investigative in nature. So, and using their area of expertise they try to make meaning of something in their own way, and try to revisit the problem and to find out like the connection between different unconnected facts. And they can also comment on the opposite side of the experts opinions on the topic. So, in a natural we can tell the role of expert witness is to identify the truth about the may be causes of accidents. So, if we take that example over here.

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The slide is titled "Abuses in courts" in red text. Below the title, it says "Hired guns:" in bold. The text continues: "This relates to helping the party at fault by giving wrong testimony". Then it gives an example: "For eg. A person who fell from the ladder sued the manufacturer for its bad quality". Finally, it states: "But the hired structural engineer wrote a report favoring the manufacturer for the money that was paid to him". The slide has a yellow background and a blue footer with logos for IIT KHARAGPUR and NPTEL ONLINE CERTIFICATION COURSES. A small video inset of a woman is visible in the bottom right corner.

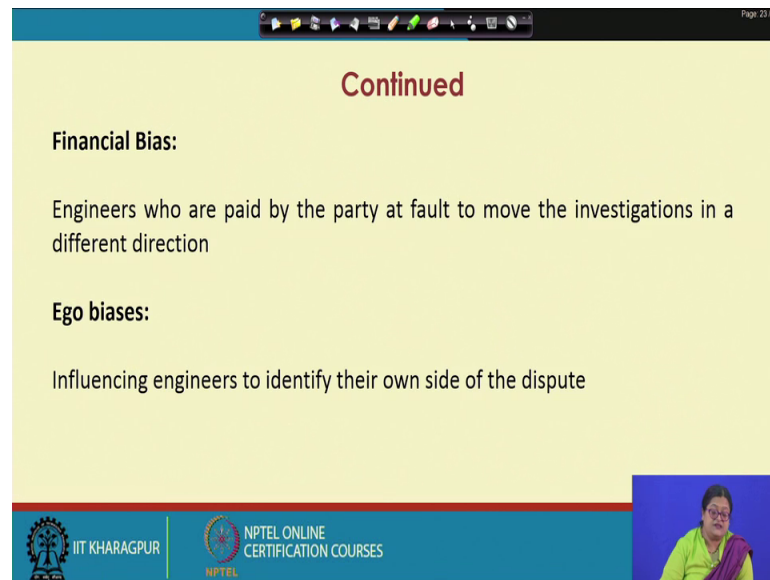
Because the role of engineers is so important, because they have a good influence on the decision making for the organization so, there could be possible abuses also.

Now, let us see some of these abuses. First is hired guns. These relates to like for the sake of money trying to have the person who is in the fault by giving wrong testimony. So, actually taking sides with the wrong person for the sake of money, this is what the definition can be think of. So, for example, person who fell from the ladder sued the manufacturer for it is bad quality, it may happen.

So, a person fell from the ladder and found like may be the manufacture (Refer Time: 32:25) like qualities bad, like finishing is not good. So, like the original role of the engineer is because he understands designing much better than the lay person. His job is to stand beside the lay person, and to question the practices of the manufacturer. But in the hired structural engineer is one who is being hired by the party who is originally doing wrong or who is at fall so that the engineer gives a favorable report for the manufacturer for the money that was paid to him.

So, this part is very important. So, I am trying to help the person who has given a wrong testimony in some which I am going to help that person in some may because he or she has given me some money.

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Financial Bias:

Engineers who are paid by the party at fault to move the investigations in a different direction

Ego biases:

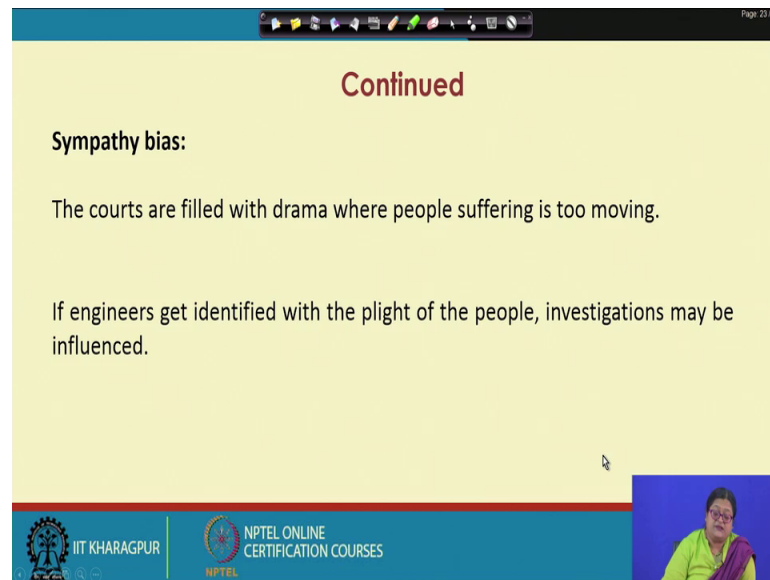
Influencing engineers to identify their own side of the dispute

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Next is we can talk of financial versus engineers, who are paid by the party at fault to move the investigations in different directions. So, if we try to bring in different tracks to a discussion and everything may be one thing is concrete to the other. So, everything may cut one through the other and we do not have like to decide what you are going to do. So, this is purposefully done to distract the processes legal processes.

So, when you are talking of financial biases, engineers are paid by the party to at fault to move the investigations in a different directions so that the people get lost and they have to start at (Refer Time: 25:43) and may be the discussion does not get completed. So, ego baises like influencing by talking influencing engineers to identify their own side of the dispute; which is maybe we should be neutral, because the primary responsibility is towards the society at large.

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The slide is titled "Continued" in red text. It discusses "Sympathy bias" and notes that courts are filled with drama where suffering is too moving. It also states that if engineers get identified with the plight of the people, investigations may be influenced. The slide includes logos for IIT Kharagpur and NPTEL Online Certification Courses, and a small video inset of a woman in a green shirt.

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Sympathy bias:

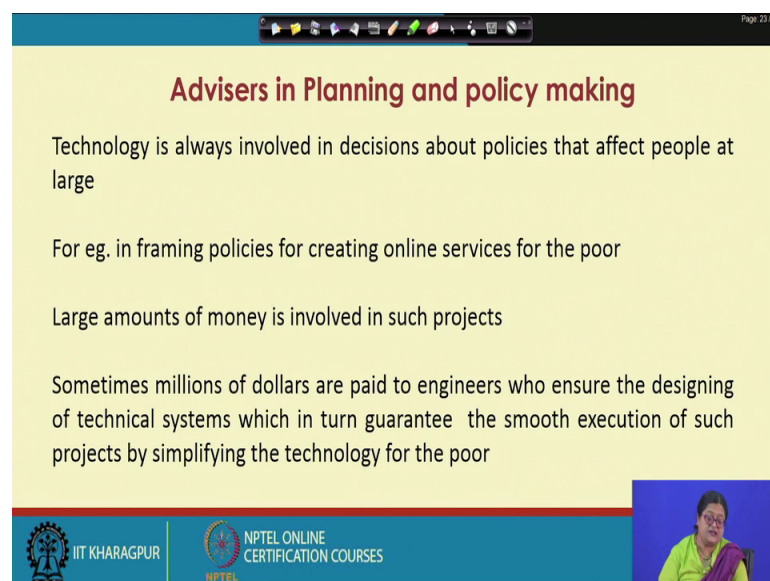
The courts are filled with drama where people suffering is too moving.

If engineers get identified with the plight of the people, investigations may be influenced.

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Sympathy bias. So, this is another thing sometimes like the court gets like, filled with people who are may be trying to express the sorrows in terms of like dramas and like very (Refer Time: 26:21) attitude. So, it may so happen like engineers may get like identified with the plight of the people, and the investigations may get influenced by (Refer Time: 26:44) if he is a very good speaker, you will start fighting for the rights of this people. And will force the government to take care of it. And so, this is one of the consequences there could be other consequences both from positive and negative aspect.

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The slide is titled "Advisers in Planning and policy making" in red text. It discusses how technology is always involved in decisions about policies that affect people at large. It gives an example of framing policies for creating online services for the poor and notes that large amounts of money are involved in such projects. It also states that sometimes millions of dollars are paid to engineers who ensure the designing of technical systems which in turn guarantee the smooth execution of such projects by simplifying the technology for the poor. The slide includes logos for IIT Kharagpur and NPTEL Online Certification Courses, and a small video inset of a woman in a green shirt.

Advisers in Planning and policy making

Technology is always involved in decisions about policies that affect people at large

For eg. in framing policies for creating online services for the poor

Large amounts of money is involved in such projects

Sometimes millions of dollars are paid to engineers who ensure the designing of technical systems which in turn guarantee the smooth execution of such projects by simplifying the technology for the poor

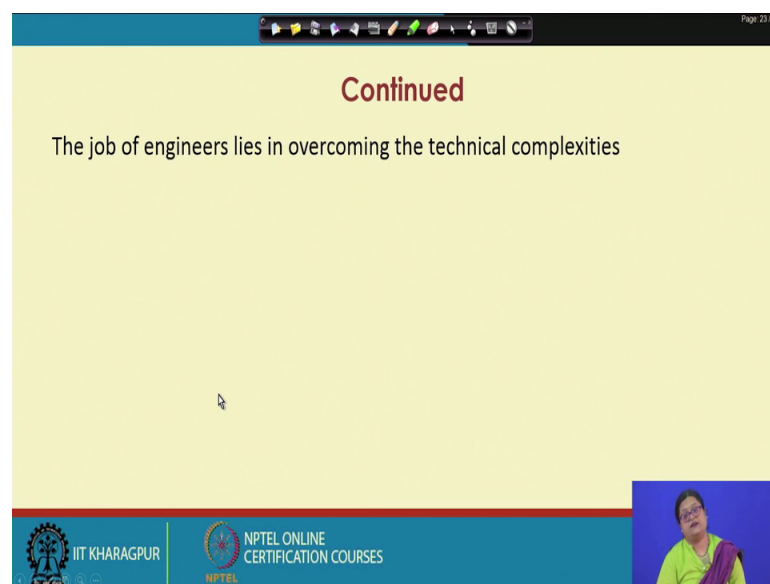
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So, after that what happens? Like another important role when you find like, after this legal aspect where they were hired is, where there were some of the biases are playing the roles and they may get sympathy bias and all. So, and that may affect the decision making. So, what we find like the another role for the consultant would be like that of advertise sorry, advice another role could be advisors in planning and policy making. So, if a planning is done a policy making is done, how do they act as advisers?

So, because it whatever decision is taken about the use of the product, and all generally it is taken about policies that effects the people at large. So, like framing policies for creating online services for the poor. So, because it involves large amount of money so, it is important like it is like the people look at it is with important, they do not come just for the sake of the money, but they understand the importance of such big projects, while such money is involved may the certain important findings are going to come out.

So, what happens? Because of this project is important, sometimes lots of money is just paid to ensure that their designing of the technical system, which in turn guarantee the smooth execution of such projects by simplifying the technology for the poor. So, because of this importance of the design, they are and there is the great involvement of the engineers, who we need to understand that; we need to understand how they may play role, how they may play the role of advisors by helping others to like reach certain objectives. And how they can make things improve on the policy making.

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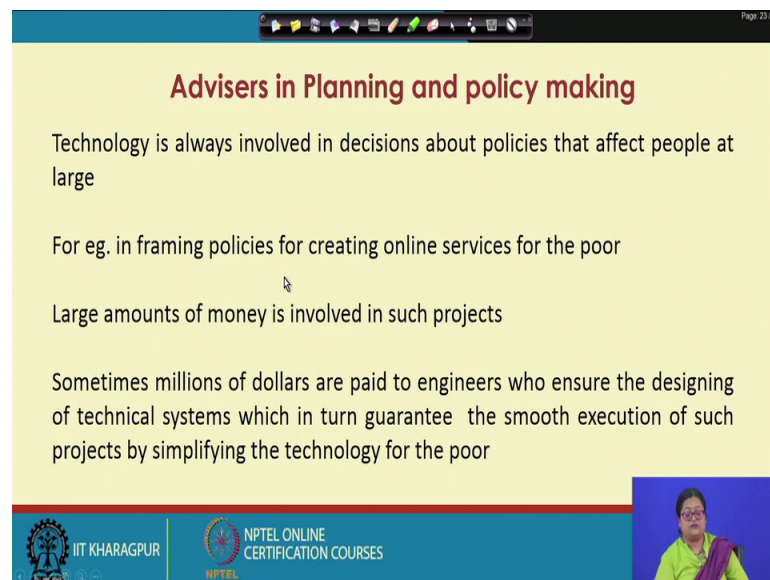
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The job of engineers lies in overcoming the technical complexities

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So, the what we find like the job of the engineers lies in overcoming the technical competencies. Why this line is important? If we go back it is really important like because such a huge amount of money is involved, then if the technology is very complex.

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The slide features a yellow background with a red title. The text discusses the role of engineers in policy-making, highlighting the complexity and high cost of such projects. A small video inset in the bottom right corner shows a woman speaking. The footer includes logos for IIT Kharagpur and NPTEL.

Advisers in Planning and policy making

Technology is always involved in decisions about policies that affect people at large

For eg. in framing policies for creating online services for the poor

Large amounts of money is involved in such projects

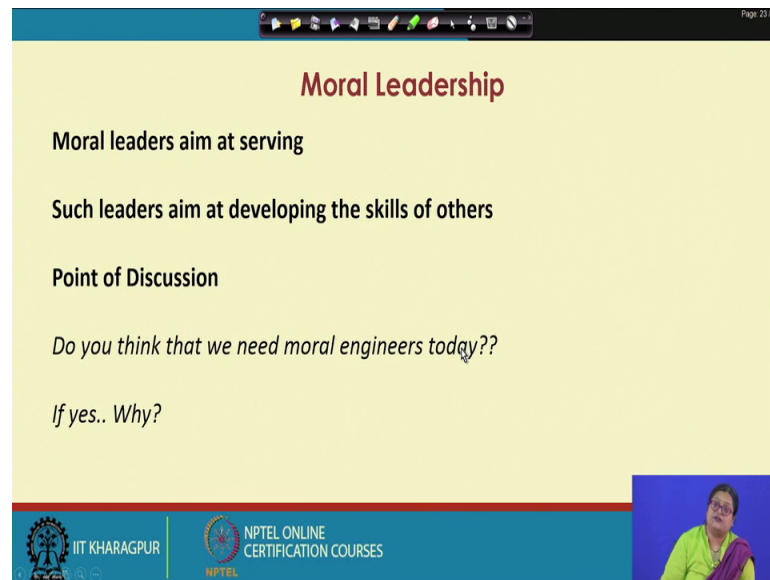
Sometimes millions of dollars are paid to engineers who ensure the designing of technical systems which in turn guarantee the smooth execution of such projects by simplifying the technology for the poor

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Some people may understand it, some people may not understand it; like, here the population as we mentioned it is a technology for the poor. So, they may not be in a position to understand very complex thing, but that complex things may need to be spoken to them in a very lucid way.

So, the role of the engineers becomes important for that, because they can understand the complexity of the issues, but while try to explain they need to like make it more a simplified version so that everybody can understand it. So, that is why it is role like the job of the engineers and how good you are in it lies in overcoming the technical complexities.

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Moral Leadership

Moral leaders aim at serving

Such leaders aim at developing the skills of others

Point of Discussion

Do you think that we need moral engineers today??

If yes.. Why?

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So, in the next session we are going to discuss about moral leadership, and which like may be aims at serving in developing skill sets of others. And like we will discuss some key questions also and try to work on it is probable answers so that we get to understand the contents of the chapter in a much better way.

Thank you.