Advances in UHV Transmission and Distribution
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Lecture – 40
Summary of the course

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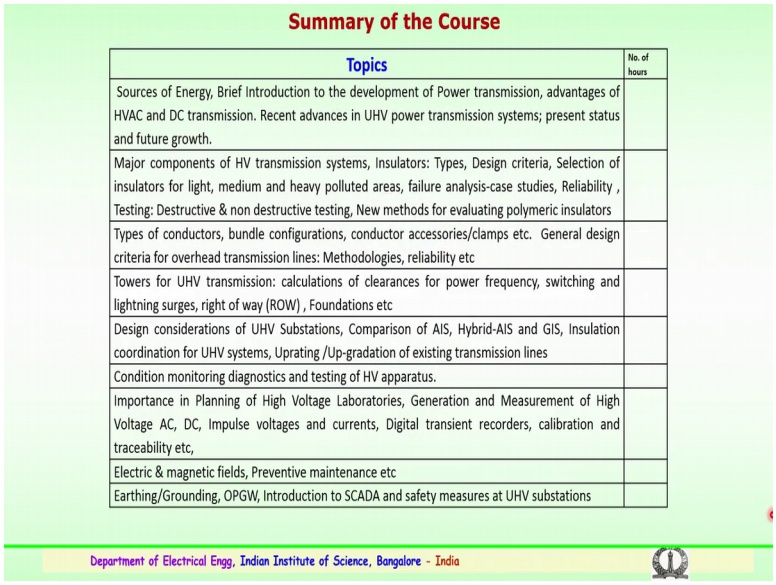

So, we look in to the summary of the entire course that is advances in power transmission UHV power transmission. We have try to cover the following aspects in the course. Initially, we have discussed about the various sources of energy like the available sources of energy, wind, solar, nuclear, renewable and so on. We have discussed about the brief introduction to the development of power transmission system or network advantages of high voltage AC and high voltage DC transmissions. And we have discussed about the recent advances important aspects in the recent advances pertaining to the extra high voltage and ultra high voltage power transmission systems, and what is a presents status and the future growth in power transmission.

Then we have a discussed about the major components of high voltage transmission systems important being the insulators which perform duel function in the transmission towers, one is to mechanically that connected to the tower and electrical isolate the conductor. We have discussed various type of insulators which are being used in the transmission for a long period of time and the newer a type of insulators which are being

used. We have discussed about the design criteria of going in for various insulators, and how the selection of insulators are to be made in case of light, medium or heavy polluted zones. We have studied about the failure analysis few case studies. We will looked in the importance of the reliability and the testing aspects for the insulators. Also discussed about the destructive and non-destructive type of testings, which are being used, and some new methods for evaluating the polymeric insulator or a composite type of insulators were also discussed.

Then we saw about a the type of conductors various type of conductors which are used in the high voltage transmission and distribution networks. We briefly will discussed about the bundle configuration, a various types of conductor accessories, power clamps, connectors etcetera. Some general design criteria for over a transmission lines the methodologies adopted and the reliability of these was also discussed

The next important component was discussed about the various of towers used for EHV and UHV transmission. We focused on the calculations of clearances for power frequency, switching and in case of lightning surges. We tried to see the importance of the right-of-way, and how to reduce the right-of-way as the voltage level goes higher and higher that is EHV and UHV transmission, how the tower size or how the right-of-way could be reduced. And very briefly we discussed about the importance of foundations for the towers, a various types of foundations which are generally carried out.

Then we looked into the design criteria of the UHV substation ultrahigh voltage substations. We have try to compare the air insulated substations. The hybrid air insulated and gas insulated substations. The importance of insulation coordination for the extra high voltage and ultra high voltage system was discussed and the up gradation or up rating of the existing transmission lines - a very important factor using the high temperature low sag conductors was also discussed. And how it could be helpful in case of the up gradation or up rating of the existing transmission line was discussed.

The important aspect of condition monitoring a very important aspect in case of high voltage systems was discussed. The diagnostics and the testing of high voltage apparatus was discussed in length. The importance of testing various types of test different types of test like the type test, routine test and the sample type of test are discussed. Further, the importance of planning of high voltage, why high voltage laboratories are essential and

different types of high voltage laboratories for universities, industries and the commercial laboratories or a testing laboratories, the certification laboratories, the planning of laboratories was discussed. Then how the generation and measurement of high voltages, it could be of AC, DC, impulse voltages, currents were discussed these are very important for the evaluation and testing of the equipments in the laboratory.

So, the generation of very high voltage is AC by using the cascade transformer. The DC using a marks circuit generator mark generators and impulse again DC sorry measurement high voltage generation of AC, DC and impulses where used. And the importance of measurement of high voltages for all the AC, DC and impulse and impulse currents was also briefly discussed. Further, introduction to the digital transient recorders how it is being used in the high voltage laboratories for the interpretation of data measurement and interpretation was also discussed. Then finally, the calibration which is very important not only the monitoring of the equipments, the calibration and the traceability pertaining to the equipment was also discussed.

Because of the high voltages and high currents, the electric and magnetic fields could cause concern, so the aspect of electric and magnetic fields near the transmission system and also in the substation was briefly discussed, some preventive maintenance or preventive measures for this where also discussed. And finally, the very important aspect of earthing or a grounding which is very essential for the high voltage substations or the laboratory is was discussed in depth. And importance of the recent advanced particularly they optical ground wire in the transmission system how it is useful for the communication was briefly looked into. And a very brief introduction to the SCADA that is supervisory control and data acquisition was also discussed.

And finally, the safety measures and the aspects pertaining to the personal who are working at the high voltage substations, it could be extra high voltage, ultra high voltage substations and also laboratories was discussed, some remedial measures, various gadgets to be employed particularly during the maintenance and also the live line maintenance of the substation was discussed. So, this is brief summary of the course, which has been discussed.

So, thank you, thank you all.