Expansive Soil

Professor Doctor. Anil Kumar Mishra
Associative Professor
Department of Civil Engineering
Indian Institute of Technology, Guwahati

Lecture No. 28
Closure Lecture

Hello everyone, welcome back to the course, Expansive soil. This will be the Closure Lecture of this course. And before starting, I would like to thank all of you for being part of this course.

(Refer Slide Time: 0:42)

This course was created with an objective in mind to give an idea to the students, researchers, the design engineers and the site engineers about the problem related with the expansive soils and providing them a basic knowledge on handling the problems in a much systematic and scientific manner.

At the beginning of the course, I told you that a large portion of the Indian landmass is occupied with expansive soil and this expansive soil creates a lot of problem to the structures. Therefore, it is quite essential to study and learn about the expansive soil and also how to handle the problem.

(Refer Slide Time: 01:12)

And this course was designed to give an idea about the fundamentals of expansive soil and its behaviour, the swelling-shrinkage characteristics and their determination, how to determine the swelling behaviour, how to determine the shrinkage behaviour in the laboratory, and what are the different factors which controls the swelling-shrinkage behaviour of the soil, and how to treat an expansive soil in the field.

If we encounter an expansive soil in the field, then what are the different methods of treatment, then what are the different engineering applications of the expansive soil? Keeping all these objectives in mind the course was designed.

(Refer Slide Time: 02:04)

The course was delivered in 8 weeks and the course was divided in 8 modules and the total number of 24 lectures were given to cover this subject. In the module 1, the Introduction to Soil Mechanics, I explained you about the different methods of formation of the soil, the index properties and classification of the soil and engineering properties of the soil.

The first module objective was to give some basic knowledge or idea about the soil and their behaviour to the participants to give the basic idea about the Soil Mechanics. The module two was related with the clay mineralogy. In this module, I discussed in details for different clay mineralogy, their identification and their properties, and how these clay minerals control the soil behaviour.

In the third module, I gave some introduction to the expansive soil, how the soil expands and how this creates problem to the structures or foundation. In the fourth module, I explained you about the, the swelling behaviour of the expansive soil.

In this module, I explained you about the soil-water interaction, that means how the soil expands when in contact with water and the swelling behaviour of expansive soil. How to determine the swelling behaviour and the factors which controls the diffuse double layer thickness, then how to determine the swelling properties in the laboratory, the classification and prediction of this expansive behaviour in the field. Then, I explained about different factors controlling the swelling behaviour of the soil.

In the module 5, I explained about the swelling-shrinkage, characteristics of expansive soil in which I explained in details about the shrinkage behaviour of the soil, the factors which controls the shrinkage behaviour, and how to determine the various parameters of shrinkage characteristics in the laboratory. So, all these things were covered in the module 5.

In the module 6, I explained you about the different Thermo-Mechanical-Hydraulic and Chemical behaviour of the expansive soil. How these expansive soil behaves when there is a temperature change or when it comes in contact with different chemicals under different mechanical forces or what is their hydraulic behaviour under different factors. So, in this module, I discussed about the Thermo-Mechanical-Hydraulic and Chemical behaviour of Expansive Soil.

In the seventh module, I discussed about how to treat an expansive soil when we encountered in the field. In this I discussed briefly about different methods related with mechanical treatment, hydraulic treatment, chemical treatment and treatment by inclusion and

confinement. Since all these methods are very large and it is a subject by itself, so, therefore, I discussed briefly about all these methods.

In the last module, that is module 8, I explained you about the different application of expansive soil, particularly, how to design a foundation, when we encounter an expansive soil in the field, what are the different methods of providing foundation, what are the different types of foundation which we can provide. So, I discussed all these things in the module 8.

And in the last class I explained you about the different geotechnical engineering application of expansive soil. In this lecture, I explained what are the different engineering application, how we can use or how we can take the advantage of the swelling and low hydraulic conductivity of expansive soil for different geotechnical applications particularly in the field of landfill or nuclear waste repository or as a slurry wall, as a drilling fluid. So, all these applications are discussed.

(Refer Slide Time: 06:08)

And before ending this course, once again, I would like to thank all the participants who have been part of this course for last 8 weeks. And also I would like to thank my students, Riya and Mahesh for actively helping me in designing and producing these lectures. And also, I would like to thank the Centre for Education and Technology, CET IIT-Guwahati, and NPTL, IIT-Madras for giving me an opportunity to offer this course. And if you have any suggestion or any doubt related to the topic, lectures, then please do not hesitate to contact me on this email address.

And thank you very much for participating in this course. And I wish you all the best for your future. Thanks.