

DEPARTMENT OF CIVIL ENGINEERING
AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY

Event Report

Event Name: Seminar on Finite Element Analysis of a Deep Excavation

Aim of Event: Finite Element Analysis of a Deep Excavation

Participation: 70 participants from Department of Civil Engineering, Amity University Haryana

Date: 26 March 2019

Venue: Smart Class Room, C-214, ASET, AUH

Organized By: Department of Civil Engineering, ASET, AUH

Speaker: Mr. Sivasubramanian, General Manager, Ram Caddsys Pvt Ltd., Chennai.

Faculty Coordinators:

Chair: Prof.(Dr). Sridhara. S.N. Director, Amity School of Engineering & Technology, AUH.

Co-Chair: Prof. (Dr.) Malik .R.K. Prof. & Head, Dept. of Civil Engg., AUH.

Convener: Dr. Naveen B.P., Associate Professor, Dept. of Civil Engg., AUH.

Hospitality: Mr. Lalit Kumar Yadav, Assistant Professor, Dept. of Civil Engg., AUH.

Outcome related to Academia Connect

Rapid development of infrastructure facilities particularly in urban area is the urgent need in developing country like India. Such urbanization is normally associated with soil excavation to construct surface and subsurface facilities. In most of the cases, excavations are carried out in densely populated areas. Therefore, it becomes necessary to check the effects of excavations on surrounding structures. To deal with such situation, it is essential to predict the behaviour of such excavation well in advance. The prediction of ground movement and necessary measures to mitigate any adverse situation is of utmost importance before excavation to ensure the safety and serviceability of surrounding properties. Improper planning and design of deep surface excavation may lead to collapse of side-wall which may propagate to the surrounding structures. Thus, the success of project depends upon good planning and preparedness to avoid any adverse effect on existing structures. Based on the ground conditions of available site, necessary measures have to be taken to carry out excavation. Critical areas are identified by simulation with logical numerical modelling. Thus, the numerical analysis helps in rationalizing a stipulated measure to make the site suitable for construction. The accuracy of quantitative prediction of deformation, ground water condition and many other parameters depends on correct interpretation of numerical tools as well as proper estimation of non-homogeneous soil parameters. The focus of the seminar discusses the finite element (PLAXIS) intended for two-dimensional & three-dimensional analysis of deformation and stability in geotechnical engineering and rock.

Outcome related to Industry Connect

Overall, it was an overwhelming experience where the experts shared their insights and gave new perspectives which can lead to further sustainable action and fruitful interactions.

This seminar includes with a discussion about the development of Finite Element Method (FEM) codes, written especially for geotechnical problems, are used to analyze stability and ground movement due to excavations. Various constitutive soil models, from a simple elastic model to mathematically complex non-linear elasto-plastic models, have been developed to explain the strength and the deformation behaviour of soft soils and rocks.

For today's infrastructure demands, geotechnical considerations are coming to the fore. Urbanization, for instance, drives growth both vertically and underground, with emphasis on the capacity of foundations and tunnels. And new infrastructure projects of every type depend upon constructed dams, embankments, dikes, levees, and reservoirs to improve their resilience. Moreover, new asset types such as offshore wind turbine structures require new geotechnical analysis capabilities, in this case to be accomplished with PLAXIS.

Because infrastructure assets are crucially linked to subsurface environs, they are vulnerable to geo-environmental risks including seismic activity, subsidence, and weather impacts. Leveraging new digital workflows which incorporate real-time monitoring and analytics during infrastructure operations, geotechnical professionals can play the increasingly valuable role they deserve in achieving geo-environmental resilience.

Outcome related to Students Learning & Grooming

The students will be able to understand efficiently to create models with a logical geotechnical workflow. Via Boreholes users can define complex soil profiles or geological cross-sections. In the Structures mode, structural elements, like piles, anchors, geotextiles, and prescribed loads and displacements can be defined. Geometry can also be imported from CAD-files. The automatic meshing procedure creates a finite element mesh almost immediately.

With Staged Construction users can accurately model the construction process, by activating and deactivating soil clusters and structural elements in each calculation phase. With plastic, consolidation and safety analysis calculation type, a broad range of geotechnical problems can be analyzed. Constitutive models range from simple linear to advanced highly non-linear models through which soil and rock behaviour can be simulated. Well proven and robust calculation procedures ensure converging calculations and accurate results. With multi-core calculations and 64-bit architecture PLAXIS can deal with the largest and most complex models.

The versatile Output program offers various ways to display forces, displacements, stresses, and flow data in contour, vector and iso-surface plots. Cross-section tools allow more detailed analysis of results. Data can be copied from tables or via Python based scripting for further processing purposes outside of PLAXIS. The Curve manager enables graph creation, plotting various results types from available calculation data.

Outcome related to Society outreach

Nowadays, some commercial FEM codes, written especially for geotechnical problems, are used to analyze stability and ground movement due to excavations. Various constitutive soil models, from a simple elastic model to mathematically complex non-linear elasto-plastic models, have been developed to explain the strength and the deformation behaviour of soft soils. However, there is still a problem with predicting the movements in and around an excavation using numerical methods. The results of a numerical analysis may be influenced by many factors, such as simplified geometry and boundary conditions, mesh generation, the initial input of the ground conditions and the constitutive relationship chosen to model the behaviour of the soils. An example of a recent finite element study is the analysis of the behaviour of a mechanically stabilized earth wall.

Glimpses of the Event (Photographs)



Welcome address by Prof. (Dr).Sridhara .S.N, Director, ASET



Expert Talk Address titled **“Finite Element Analysis of a Deep Excavation”** by Mr. Sivasubramanian, General Manager, Ram Caddsys Pvt Ltd., Chennai.



Discussion Session with students by Dr. Naveen BP



Presentation of Memento to Guest Speaker

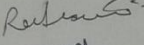
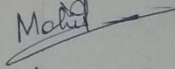
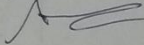


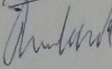
Vote of Thanks & Concluding Remarks
Prof. (Dr.) R.K. Malik, Head, Department of Civil Engineering

Glimpse



Group Photo: Department of Civil Engineering Faculty & Students with Guest Speaker

Name	Signature
<u>B.Tech 6th Semester</u>	
1. Ratnesh	
2. Robin Saini	
3. Mohit Kumar Gupta	
4. Anam Saini	

MECHANICAL ENGG. ECE		Signature
Name	Branch	
Tony Joshi	M.Tech (M.D.)	
Shashikant Pradhan	M.Tech (M.D.)	

Attendance

Name	Br.	Signature
<u>M.Tech Structural Engg.</u>		
1. Karthik		
2. Vishnu		
3. Raghu		
4. Aakash		
5. Devanshu Mehra		

M.Tech Transportation Engg

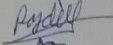
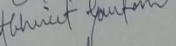
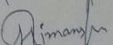
1. Yogesh Jha	
2. Kapil Joshi	
3. Abdul Qadir	
4. Sathish Mittal	
5. Sidhard Patel	
6. Faidon	
7. Piyush Kumar	
8. Abdul Hamid	
<u>B.Tech Civil 4th Sem</u>	

1. Rakshan Khajuria	
2. Lakshay	
3. Samir Hussain	
4. Kunal Gupta	
5. Shankar Rakesh Gothwal	

M.Tech Thermal Engg/IP/MD

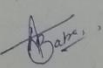
① Hoshiyar Singh	
② Salshabeel Khurshid	
③ Prashant Raghav	
④ Shashikant Pradhan	

B.Tech 8th Semester

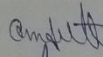
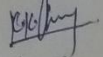
S.No.	Name	Signature
1.	Intikabing	
2.	Mika Bansal	
3.	Rajdev Singh	
4.	John Vot	
5.)	Dhinesh	
6)	Utkarsh Mudgal	
7)	Abhinav Gautam	
8)	Himanshu	

26/08/19,

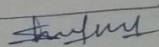
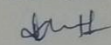
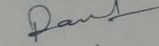
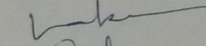
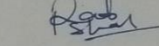
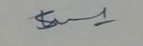
Name Signature

1.	Kalit Kumar.	
2.	Sambhav Jain	
3.	Ankit Batra	
4.	Sakshi Gupta	
5.	Dr. Naveen BP	
6.	Dr. Malik RK	

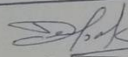
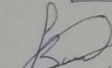
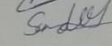
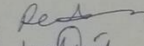
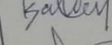
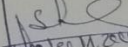
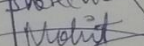
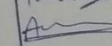
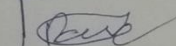
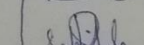
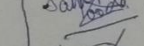
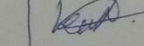
Name Signature

1.	Omdutt	
2	Krishant	
3	Sanjeev.	

B.Tech 4th Semester

S.No.	Name.	Signature
1.	Sarwar Hussain	
2.	Kunal	
3.	Pankaj	
4.	Lakshay	
5.	Rakshan	
6.	Shubham	

B.Tech 6th Semester

S.No.	Name	Signature
1.	Deepak	
2.	Kunal	
3.	Sandeep	
4.	Robin	
5.	Sahil	
6.	Spheer Srinivasan	
7.	Mohit	
8.	Aman	
9.	Pankaj	
10.	Sahil Kooda	
11.	Lakshay	
12.	Ratnesk	
13.	Sarfraaz	