GEOTECHNICAL RESEARCH GROUP

Universidad de los Andes

Geothecnical Research Group
Universidad de los Andes, Bogotá, Colombia

PROFESSOR

Prof. Arcesio Lizcano Peláez, PhD.

STUDENTS

PhD. Students:

- ✓ Ing. José Andrés Cruz. M.Sc. (*Unsaturated soils*)
- ✓ Ing. Diana Katherine Reyes. M.Sc. (*Seismic wave propagation*)
- ✓ Ing. Hugo Alexander Rondón. M.Sc. (*Dynamic behavior of unbound granular materials*)
- ✓ Ing. Luis Felipe Prada. M.Sc. (*Characterisation of intergranular strain in a hypoplastic constitutive model*)
- ✓ Ing. Alfonso Mariano Ramos. M.Sc. *(Micro and macromechanics of shear localization and progressive failure)*
- ✓ Ing. Pablo Andrés Arias. M.Sc. (*Extended hypoplasticity for sands and gravels*)

M.Sc. Students:

- ✓ Ing. Carlos Mauricio Boton (*Micromechanics and viscosity*)
- ✓ Ing. Alvaro Camilo Bravo (*Micromechanics and anisotropy*)
- ✓ Ing. Jorge Alexander Carranza (*Piled raft foundation*)
- ✓ Ing. Carlos Eduardo Espinosa (*Sand production*)
- ✓ Ing. Juan Alexander Gómez (*Granular temperature*)
- ✓ Ing. Wilson de Jesús Herrón (*Dynamic soil-structure interaction*)
- ✓ Ing. Lina María Torregrosa (*Micromechanics in crushing*)
- ✓ Ing. Diana Paola Solaque (*Mud and debris flow modeling*)
- ✓ Ing. Andrés Nieto Leal (*Localization with hypoplasticity*)

Alumni:

- ✓ Ing. María Cristina Herrera Ardila, M.Sc, PhD. *(Colombian volcanic ash soils)*
- ✓ Ing. Jaime Fernando Eraso, M.Sc. (*Dynamic soil-structure interaction*)
- ✓ Ing. Francisco Javier García, M.Sc. (*Piled raft foundation*)
- ✓ Ing, Carlos Eduardo Grandas, M.Sc. (*Non linear soil dynamic and Viscohypoplasticity*)
- ✓ Ing. Thomas Julián Solano, M.Sc. (*Sofware development for hypoplasticity*)

RESEARCH TOPICS

- ✓ Constitutive models: Hypoplasticity and viscohypoplasticity.
  - Numerical simulation of boundary value problem and element tests.
  - Application to unbound granular materials
  - Software development
- ✓ Behavior of volcanic ash soils.
- ✓ Unsaturated soil behavior.
- ✓ Seismic wave propagation and non-linear dynamic soil response.
- ✓ Dynamic soil–structure interaction
- ✓ Piled raft foundations.
- ✓ Micromechanical behavior of granular soils.
- ✓ Sand production.
- ✓ Characterization of Bogotá soils.

The main purpose of researching in Geotechnical Engineering Group is to understand the behavior of soils and structures interacting with soil.

Hypoplastic and viscohypoplastic constitutive models are used to simulate soil behavior. A special user subroutine, developed by Karlsruhe University (Germany) is applied in the ABAQUS program for introducing the constitutive law into the numerical modeling of boundary value problems: seismic wave propagation in soils, soil-structure interaction, pipe-soil interaction, pavements and unbound granular materials.

Moreover, the Geotechnical Engineering Group is developing a software based on hypoplastic and viscohypoplastic models and finite element methodology (FEM) for geotechnical problems.

The study of volcanic ash soils and unsaturated soils by two doctoral students is a perfect complement to understand special phenomena of soils.

Geotechnical-Geoenvironmental research in the Geotechnical Engineering Group includes studies of remediation of contaminated soils and Bio-engineering.

COURSES IN GEOTHECNICAL ENGINEERING

- ✓ Advanced soil mechanics
- ✓ Slope stability
- ✓ Mechanics of continuum media
- ✓ Finite elements
- ✓ Seismic engineering
- ✓ Dynamic soil-structure interaction
- ✓ Underground constructions
- ✓ Advanced design of foundations
- ✓ Advanced design of pavements
- ✓ Unsaturated soils

COURSES OFFERED BY THE GROUP

Some members of the Geothecnical Research Group offered the curse: “Hypoplasticity and Viscohypoplasticity” and “Numerical simulation in ABAQUS” in June of 2005 for their classmates.

FOREIGN VISITORS

Dr.-Ing. Roberto Cudmani

Dr.-Ing. Cudmani of the Institute of Soils and Rocks Mechanic, Karlsrue University, Germany, visited Los Andes University on August of 2004. He taught a course about hypoplastic and viscohypoplastic constitutive models.

Prof. Carlos Santamarina

Prof. Santamarina (Georgia Institute of Technology, Atlanta, USA.) was in Colombia in February of 2005 working on the research of volcanic ash soils. He was a special lecturer in the Geotechnical Seminar 2005 – Universidad de Los Andes.

Dr.-Ing. Hans –Gottfried Schmidt

Dr.Ing. Schmidt (Bauhaus –Universität Weimar, Germany) was in Bogotá on March 2005. He worked with the Group and was a special lecturer in the Geotechnical Seminar 2005 about seismic site investigations.

Prof. Abraham Diaz Rodriguez

Prof. Díaz Rodríguez (UNAM, Mexico) visited Colombia on October 2005. He was a Coffee Seminar special lecturer and special lecturer in the Geotechnical Seminar 2005 about the behavior of Mexico soils.

Prof. Ioannis Vardoulakis

Prof. Vardoulakis (National Technical University of Athens, Greece) came on April 2006. He worked with graduate students and gave a lecture about the modeling of Vaoint reservoir failure.

Prof. Hans Herrmann

Prof. Herrmann (ETH Zürich, Switzerland) has been in Colombia many times, the last one on August 2006. He shared his knowledge with the Geotechnical Research group about the micromechanical behavior of granular materials.

ACTIVITIES ABROAD

15 students of the group spent 18 days during summer 2006 on a cultural and academic visit to cities and research centers in Germany, Switzerland, Italy and France. The trip was sponsored by the German government, Los Andes University and the students themselves.

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