

Modern categorical engineering

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Modern categorical engineering begins with Karl Von Terzaghi; he can also be counted as a father of modern soil mechanics. Following name for modern categorical engineering is Arthur Casagrande. They were both Austria born, educated in Europe, and moved to the United States early in their careers, where they involved in their international and history-making work. Arthur Casagrande was born in August 28, 1902, in Headscarf, Austria. He first encountered with technical knowledge after he attended Realschule.

Then he graduated from the Technical University in Vienna where he got his civil engineering diploma and assisted to Professor Schaffer in the Hydraulics Laboratory. He lost his father in the same year. In those years, between 1914-1918 World War 1 occurred, as it affected many people in different ways, it also affected to Casagrande. The dual monarchy, Austrian- Hungarian Empire dissolved on 31 October 1918 as a result of World War 1. This would be a main reason for him to move United States because there was low possibility to work as a civil engineer and research in his field. By the way his father's death in 1912 had affected his entire family economy. From that time till his brother got a job, he had the all economic responsibility from his family and he worked as an assistant instructor in hydraulics at TU from 1924 to 1926. After his brother got a job, he was led by his passion for working and researching in civil engineering field widely to go New York with his wife in 1926. His mother and professor didn't support his decision but he went to New York in 1926.

Arthur Casagrande worked in New Jersey as a draftsman for couple months. He was looking for a better job in those days and for that reason he went to Massachusetts Institute of Technology for a job interview where he would

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met with Karl von Terzaghi, the father of soil engineering. Karl Terzaghi offered Greensand to work as his private assistant for the summer 1926. After that till 1932, Greensand carried out his second assistant duty with the US Bureau of Public Roads and that was also his first steady job in the US.

He assigned to MIT where he assisted Karl Terzaghi in many research projects which are mainly about improving apparatuses and techniques for soil testing. Greensand developed the hydrometer test, the horizontal capillarity test, the liquid limit apparatus, the consolidation apparatus, the direct shear apparatus, the odometer apparatus, and the shear box at MIT. It might be said that he developed these techniques after visiting and getting knowledge from the all soil mechanics laboratories in all over the Europe. Arthur Greensand was the first civil and categorical engineer who conducted the triaxial test in the US.

Another experiment, which is field investigations on frost action, was conducted with a lead of him in a cooperative project between the Bureau of Public Roads and New Hampshire State Highway Department. His results of this project about frost action have been used by many highway designers throughout the world. He also researched important differences between undisturbed and remolded soil, soil classifications. According to his work on Atterberg Limits, it is assumed that A Line on the plasticity chart attributed to him. T Greensand started graduate school of engineering Harvard University where he began to give lectures in soil mechanics and foundation engineering. He developed ground for majority of workers in soil mechanics field. His teaching program and methods made Harvard as most famous school of teaching and research in soil mechanics and foundation

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engineering field. In addition Harvard became a model for other college programs in engineering by Grandness's teaching methods. He took his official doctor of science degree in 1933 from where he got his civil engineering degree, The Technical University of Vienna.

His elevating to another position for an assistant professor in Harvard followed his achievements and he started to give a new lecture on seepage and groundwater movement. After that, as a result of his new lecture on seepage and groundwater movement, he was requested to work on a project for the US Army Corps of Engineers. Greensand accepted it and started to work for US Army Corps of during the World War 2. Officers in the soil Engineers for the first time He instructed 400 hundred engineering mechanics aspects of airfield construction through a series of intensive four week programmer.

Moreover he established the first International Conference of Soil Mechanics and Foundation Engineering at Harvard by taking advantage of his several world-class contacts within the newly emerging soils field. After World War 2 number of enrollments to his courses increased from 15 to 80, 90.

Greensand taught soil mechanics over 1400 students at Harvard and many of them became remarkable professors, researchers and practicing categorical engineers of the world. Arthur Greensand inspired greatly from investigating soil mechanics particularly the design and building earth dams during long association with the Corps of Engineers.

He investigated the failure of Fort peck Dam, the stability of the banks of the Panama Canal and the possibilities for a sea-level canal while working for the

Corps of Engineers. And furthermore he served as a consultant on several main dams built by the Corps on the Missouri River. Most difficult and highest dams all over the world didn't prevent himself to research and work on. That movement left an impression on the trend of development in this field. Move He convinced his brother Leo Greensand to to the United States and teach at Harvard.

Leo was worldwide known for research and application in the field of electro-osmotic soil stabilization. Two brothers established a firm called Greensand Consultant. Firm served to federal, state, urban, and private organizations on an extensive type Of projects which are mainly about soil and groundwater problems, design and construction of earth and Rockville dams, and foundation systems for difficult structures. Greensand Consultant's most significant contributions were the foundation designs for the Liberty Mutual, Prudential, and John Hancock buildings in Boston, the Synchrotron at the Brookhaven National

Laboratories, the construction of Logan Airport using soft clay dredged from Boston Harbor, and design of the railroad fill across Great Salt Lake.

Greensand was a consultant on the design and construction of a number of the world's biggest hydrophone dams such as the Ayah Dam in South Dakota, the Manicuring Three Dam in Canada, the Travel Dam in Pakistan which is the largest of all embankment dams and the Tapir Dam in Brazil which is the largest concentrated hydro-development in this world.

Greensand received many notable awards such as Ace's Terrazzo award which was not given anyone before him in 1963, Ace's Edmund