STEPS Students Report

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I took part in the academic program between Tokyo University and Moscow State University, named Students and Researchers Exchange Program in Sciences (STEPS) for 6 weeks: from June 1, 2018 to July 14, 2018.

During this period I was an exchange student in Institute of Industrial Science of University of Tokyo in the laboratory of Professor Reiko Kuwano. My internship took place in the Professor's office and in the laboratory with equipment for testing the mechanical properties of soils. My research work during the internship was training to work on the different types of triaxial cells: small sized cell - for sandy soils (a), large sized cell – for gravel (b); determining the velocities of primary and secondary waves and establishing their relationship with the void ratio of sand.

a b

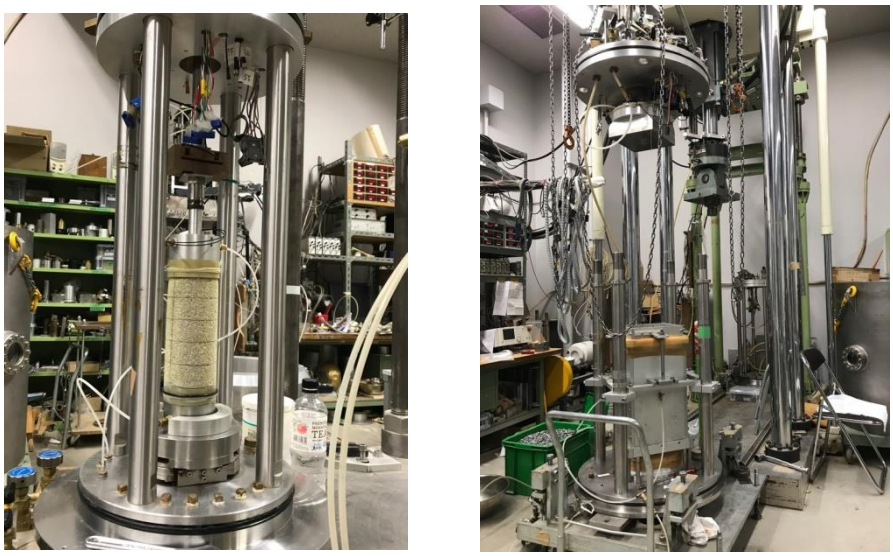

Fig.1. Triaxial tests for coarse sand (a); triaxial tests for gravel (b)

The research was conducted under the guidance of the Assistant Professor Masahide Otsubo and Doctoral student Troyee Tanu Dutta. All experiments were carried out using sandy soils. For me it was of particular interest, as my master's thesis was devoted to the study of physical and mechanical properties of sands and factors affecting them.

The interest in studying this topic is that usually researchers study the velocity of waves in the sand, but do not pay attention to the frequency of waves, which is very important, especially low frequency. This is important, since the velocity of the waves does not differ in the sands of different particular sizes, and when taking into account the frequency becomes visible gradation of sand from coarse to fine, as the sands behave differently, especially small and dusty ones. In general, for sandy soils there are being two systems: stable and unstable. The aim of the study was to find the ratio between fine and coarse sand grains, in which the mixture is as stable as possible – that is, the boundary ratio when all the pores between coarse sand are filled with fine sand, but the contacts are maintained. Tests of sand with different particle size distribution and different density of addition are held to calculate the necessary boundary void ratio.

The tests were conducted on the equipment of the University of Tokyo in Kuwano Laboratory. It is an unique equipment, created by the Collaborative researcher of laboratory Takeshi Sato.

In addition to scientific activities, I traveled a little in Japan, saw a lot of attractions, found good attentive friends and magical memories. I traveled all over Tokyo and the neighboring cities, which I really liked, especially Kamakura - my favorite city! I also learned some common phrases in Japanese and, in turn, taught the guys a little Russian. I want to thank my host Professor Reiko Kuwano and the STEPS program for this opportunity, experience and pleasant memories, that will stay with me for life!

Fig. 2. Some of my photos taken in Tokyo

Fig. 3. My amazing host professor and laboratory members ☺