BSc Thesis proposal

Optimizing Laboratory Space: A 3D-Model Approach for the Redesign of Laboratory WH114 University of Twente.

Description

This thesis presents a unique opportunity to contribute significantly to the redesign of Laboratory WH114, a vital resource at our institution. The project's core objective is to restructure the laboratory into two distinct, functionally optimized areas: one dedicated to concrete design and production, and the other to geotechnical analysis.

The student will be tasked with maintaining the laboratory's existing infrastructure, including water pipes and electrical sockets, while accommodating the specific spatial requirements of various machines and equipment. The geotechnical section will house devices such as triaxial and shear testers, oedometers, and associated computers and space for sample preparation. Simultaneously, the concrete section will be equipped with a concrete mixer, oven, electric sieving machine, and an air aspirator.

A critical aspect of this thesis is the provision of a current 3D model of the laboratory, which the student will use as a basis for their redesign. The student's challenge is to develop a comprehensive, practical 3D redesign model that effectively divides the laboratory into two separate but cohesive units. This redesign must optimize the space for functionality, accessibility, and efficiency, catering to the specific needs of both concrete and geotechnical research activities.

Additional Support and Scope:

To facilitate this redesign, the student will be provided with detailed information on all current equipment, including dimensions and facility access requirements. This information is crucial for planning the spatial arrangement and ensuring that each piece of equipment is accommodated effectively. Furthermore, the student is encouraged to propose additions or modifications to the laboratory's equipment. This may include suggesting new tools or apparatus that would enhance the lab's functionality or recommendations for optimally using the space to fit all machinery and tools effectively. The student's input in this regard will be valuable for future procurement and spatial planning decisions.

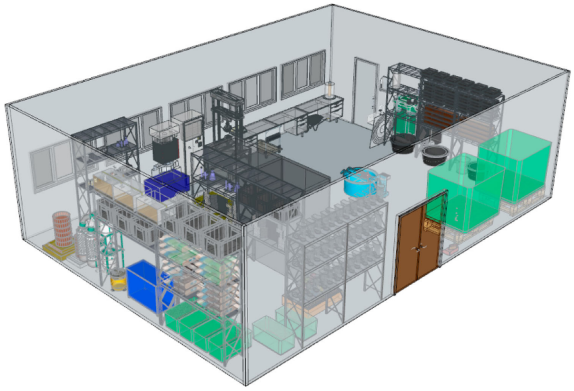

Figure 1: 3D Model of the current set-up of the Lab [1].

This project offers the student a chance to apply theoretical knowledge in a practical setting, requiring innovative spatial design, problem-solving skills, and an understanding of laboratory functionalities. The outcome of this thesis will directly impact the efficiency and effectiveness of future research conducted in Laboratory WH114.

Contact people

Floriana Anselmucci (Soil MicroMechanics Chair) f.a.r.anselmucci@utwente.nl
Vanessa Magnanimo (Soil MicroMechanics Chair) v.magnanimo@utwente.nl

References

Faridaddin Vahdatikhaki, Ilona Friso-van den Bos, Sajad Mowlaei, and Bas Kollöffel. Application of gamified virtual laboratories as a preparation tool for civil engineering students. *European Journal of Engineering Education*, pages 1–28, 2023.