

Bachelor's Thesis, Term Project

Autonomous Robot for Space Exploration Objectives Using a Schmidt Hammer: Design, Fabrication and Control

Supervisor (s): (Assist. Prof. Dr. Eng. Amir Roushdy)
(Assoc. Prof. Dr. Eng. Amr ElNemr) from Civil Engineering Department

Crack detection is the process of detecting the crack in the structures using any of the processing techniques. The crack detection can be made in two ways. They are Destructive Testing and Non-Destructive testing. In this project a fully autonomous robot will be used for crack detection using a Schmidt hammer will be an automatic crack detection is very effective for Non-destructive testing. **The project will be in collaboration with the Civil Engineering department and there is other students in the Civil Engineering Department will be working with you.**

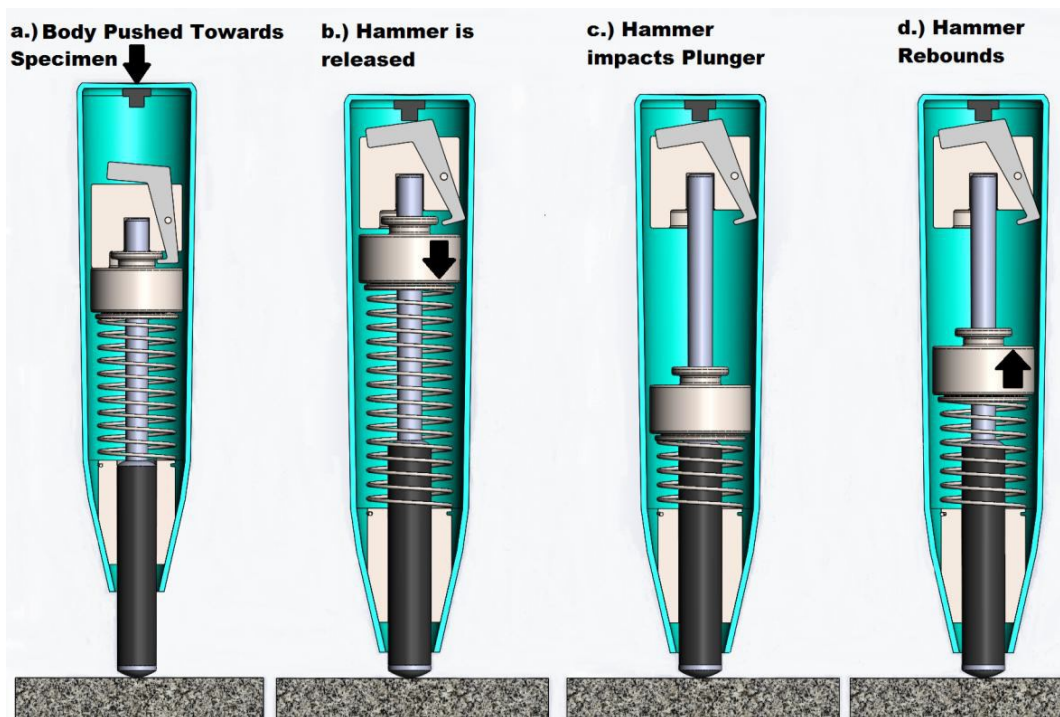


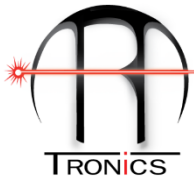
Fig.: Operation of a Schmidt Hammer

Project description and objective:

This project will be used for Crack integrated detector is mainly used for crack width and crack depth measurement of bridges, tunnels, buildings, roads and so on. Concrete Test Hammer, Schmidt Hammer, Concrete Test Machine.

For more details please contact:

Assist. Prof. Dr. Eng. Amir Roushdy, Room: C7.108, E-mail: amir.ali@guc.edu.eg, Web site: www.aratronics.com



Research focus of this project:

- Literature review on the project should be studied properly.
- Not only, creating a software control system for the project but also the hardware.
- Experiments using the gadget and control system should be built properly.
- The outcomes must be documented.

Requirements:

- Passionate to learn more about 3D Printing design, Robotics and control.
- Prior mechatronic design expertise is desired like "SolidWork".
- Enthusiasm for completing actual practical work with 3D printing staff (design fabrication and construction).
- A method of working that is both structured and self-contained.

General tasks of the project:

- The complete methodology is already available in the ARATRONICS Lab and the Schmidt Hammer is already in the Civil Engineering Department, so we will discuss it from the first day to start the automation process for it
- Fabricate the robot/system using 3D printer/CNC machine (small parts).
- Assembly all parts of the Robot.
- Changing the working variables and see the effect on the robot.

Other notes:

- A weekly meeting with the advisors will be required for this project, as well as weekly progress updates (***The meeting could be more than once during the week based on your progress and based on your achievements***).
- You should to be in the Lab two days per week (***It could be more than two days based on your progress and based on your achievements***).
- All reports must be prepared in the style of a research paper.
- The outcome of this research will be published in one of the coming international Conferences and , or Journal