ABSTRACT:

Existing piles require an unsustainable increment in size to support the loads imposed by of present day structures. New piles called smart Thriving Friction by Extruding Gear (TFEG) can curb the size required using fins attached to the ends of the piles. They are installed using a unique technique; first, they are driven into the ground like regular piles, however unlike modern piles hydraulic fluid is sent through the smart TFEG. The hydraulic fluid forces the fins out and locks the pile into place. The fins are believed to increase the capacity of the piles. The purpose of this study is to investigate how the fins function and locate the ideal arrangement of fins. The soil used in this project is transparent soil formed by using mineral oil having a refractive index matched with the fused quartz refractive index. The mineral oil is a blend 68% puretol-7 and 32% Krystol-50 to reach to require refractive index, which equal to 1.4585. The fused quartz dispersing into the oil from a small distance of approximately 25 mm to decrease the air bubbles within the sample. Prior studies demonstrate that the transparent soil is very similar to the soil the piles would be inserted in. However, unlike to regular soil it is not opaque and we can in this manner watch the piles behavior once implanted in the transparent soil. As a pullout force is applied, to reproduce this present reality stresses, we will observe the diverse piles reactions. Image of soil movements as the pile movement will captured. After a computer analysis, we will better have the capacity to measure the conduct of the smart TFEG. We will likewise have decided the best pile in opposing the upward force. With this data, the smart TFEG innovation could be completely used in the development of new and potentially existing structures.