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The New Evolution Mackintosh Probe (NEMP)

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Statement and Causes of Problem

There are many advantages of the Mackintosh Probe, but there are also some error and disadvantages of Mackintosh Probe. Human errors are also prone in this method such as wrong counting, non-consistent drop height or exerting force to the drop hammer giving misleading results. The not accurate vertical angle while doing the penetration work also will effect the data . Therefore, many errors might occur during this process due to human error that cannot be prevented and this will affect the results of the investigation. The application of the Mackintosh Probe must be followed thoroughly as it might affect the end result of the soil investigation.

Even though the Mackintosh Probe is said to be a light tool, but the limitation of human strength will eventually become a factor of human error because this tool tend to use a big portion of human energy in a long term usage. By understanding it, we can create the new mackintosh probe that more accurate and no modification of the Original Mackintosh Probe Function.

Methodology

First, we discuss to make a proposal and choose the best ideas about the project among us. The proposal must have a good and useful information to produce a project model. Proposal ideas must be approved by the panel first before we proceed to producing our project.

After we have approval from panels for our project, we have to design the project structure. By using Autocad we create model design of our project and determine the appropriate size and the best mechanism. Diagram below shows our project design: (*Figure 1* and Figure 2)
We also doing a research of our project materials and the cost to produce this project. Planning of design process is very significant thing before start the project. It is to ensure that don't have any mistake while doing this project. It is because if there is any problem happen it's will affect the cost to be highest cause to fix it. That's why, the planning process of design is importance before start project.

After done of design process we continue to prepare a material to create the project. We have make survey to many store to get the best and cheap materials. We had use a steel, hollow steel and galvanized pipe steel. We connect all of this material by using MIG welding and cut it using grinder. Diagram below shows complete project: (*Figure 4*)

To determine whether this project is successful or not. The data decision test will be done. The soil investigation by using the old Mackintosh Probe and the new Mackintosh Probe must be done in the same area. The results will be based on the difference in results between the present Mackintosh Probe and the new Mackintosh Probe. If the results of the new Mackintosh Probe are similar to those of the old Mackintosh Probe, the objective of this study is success.

In our study, we will use graphing data methods to determine whether this project is successful or the opposite. Cumulative Number of Blows versus Depth Graph will be used to determine soil test results for **Data decision test**. The results of this study will be based on the information obtained.

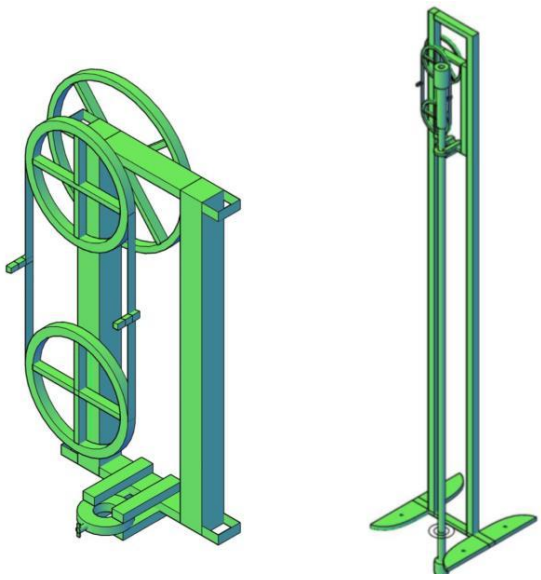

Figure 1. Illustration of the initial design

Figure 2. Illustration of the final design

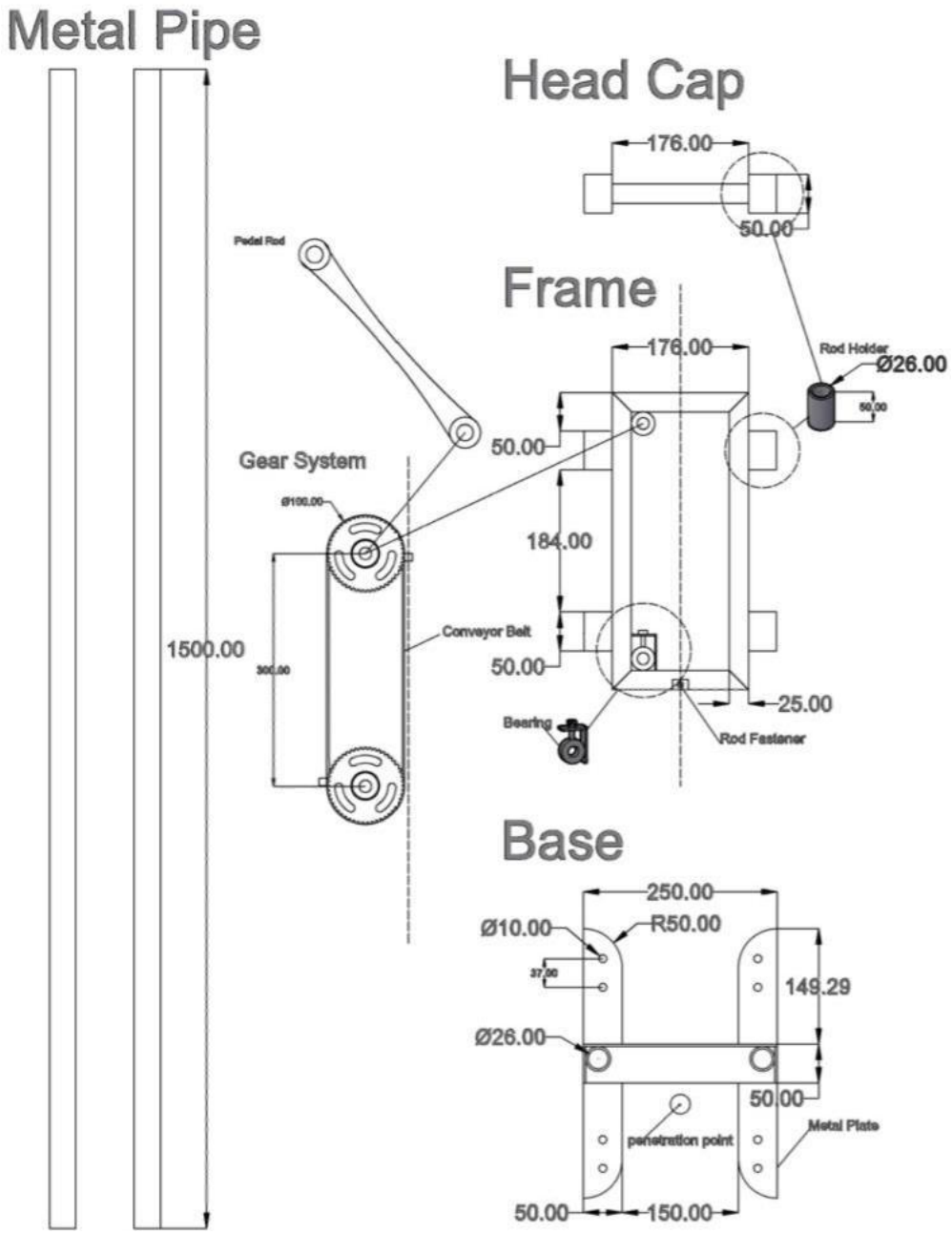

Figure 3 Dimension of the final design

Figure 4 Project model

Solution Proposal (Creativity, Quality and product value added)

Creativity

The new evolution mackintosh probe uses the concept of gear and pulley in vertical load movement mechanisms to maintain uniform height. This gear mechanism makes the works easier by using less energy but the resulting power is greater. Beside that, the work force can be reduced. In addition, this consistent and repetitive work can produce work quickly and accurately compared to manual ones that don't use the gear system.

Quality

The material to making the NEMP, we use angle bar, plate bar, steel hollow section, gear, bearing and chain. By using this material the NEMP will be more strong and can support the load.

Product value added

The added value of product is we created a 90 degree rod holder site. So, the NEMP more stable and can accurately take the correct data with the right vertical angle.

Benefits (Society/Country/Economy/Environment)

Society

- Eliminating the burden of the user.
- Eliminating the miscount of the blows.
- Can reduce the quantity of worker.

Economy

- Can reduce the cost of the project and payroll cost to employees.
- Can develop the country's economy with the creation of new tools.

How to Implement / Method of Use

This **NEW EVOLUTION MACKINTOSH PROBE (NEMP)** is very easy to use and does not complicate, as our objective is to make the test easier. We will tell you how to use our (NEMP) completely in the order of the steps below:

1- Apply grease oil on the connection part of the mackintosh and the rod so that it is smoother to remove the rod and store the tool.

2- Make sure the (NEMP) is placed in the test site correctly and Place the mackintosh probe in the middle of our (NEMP) by placing the rod in the path provided in the tool.

3- Hold the paddle on the side (NEMP) and do a full turn on the paddle so that all the systems we set can work especially to lift the load repeatedly.

4- The mackintosh hammer will be stuck or stuck in the chain of the (NEMP) as we set which causes the hammer to rise upwards. Next, upon reaching the height limit we set, the hammer will stop clinging to the chain and fall to strike the mackintosh rod.

5- A full round paddle for the (NEMP) we created is equivalent to one stroke for the mackintosh hammer. Therefore, this (NEMP)tool also has a counter to make it easier to test on the construction site.

Conclusions

The conclusion of this study is that the present Mackintosh probe do have limitation on its application. The user required enormous amount of energy due to the weightage of the 4.5 kg dead weight and the condition of the usage of the tool must be in a condition which is very tedious just to get an accurate result. Thats why with this created of the NEMP will make it more easy to use and to get the accurate data. By using this project will also reduce the human error. It is safe to conclude that the objective of this study is achieved with the existence of the NEMP which can improved the present Mackintosh Probe in terms of the results accuracy. Without an accuracy result in any investigation study, the work is useless and can devote a huge catastrophe that may leads to death and destruction. Lastly, this product can be improve if the product being study in more details.