Matthew Mendenhall, Sophia Lopez, Riley Ibero, Trey Williamson

Dr. Wissam Kontar

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Project 2

This project focused on automating the NDOT concrete mix Excel sheet into a fully automated python program. The client wanted our group to do the following requests: (1) Translate the excel logic into python so we can replicate all calculations found in the Mix Design tab of the NDOT excel workbook. (2) Implement sequential user inputs in a program step by step and in logical order so that it mirrors the excel worksheet. (3) Generate a final mix design output with a program showing a formatted weight chart for one cubic yard of concrete and output values that are labeled and presented in a professional, client-readable format. (4) Prepare and evaluate four concrete mix scenarios based on the Python model our group provided.

To do the project, the requests were taken with certain tasks. The first task we did was review the excel model. Our group reviewed the NDOT concrete design Excel sheet that was provided to us and from that, we could identify the equations that are needed to create our Python code with the user input needed to create the concrete model. Next, create functions that will be able to calculate all the calculated weights and volumes based on the user's input. Our group created a user interface for all the elements that are in the concrete mix. It will enter the values in a specific order, and the program will calculate the weight of each component. Once our group's python code is complete and the interaction works, we developed 4 concrete mix designs to prove that our model works and document it to the client.

As a result, our Python code showed a user input collection from the excel sheet, the mix design calculations, an output weight chart, and a run design to see if our code worked. Then, we did our four mix design scenarios to see if the code worked. With the sources we used, we were able to have given inputs and create outputs in a table. The four mix design scenarios that were used were different paving mixes of 47BR. They were fly ash bend, high early strength blend, fly ash concrete blend, and silica fume durability blend.

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