Scope of Work

Project: Automation of Concrete Mix Design Model

Client: Nebraska Department of Transportation (NDOT)

Project Overview

The Nebraska Department of Transportation (NDOT) has engaged this project team to automate the Excel based concrete mix design model and convert it into a Python design model. The purpose of this project is to improve the calculation reliability, transparency, and repeatability of the model. The model provides user inputs in sequential orders and automatically calculates a final concrete mix weight chart for one cubic yard of concrete.

Project Objectives

The objectives of this project are to:

- Replicate all concrete mix design calculations currently in the NDOT Excel "Mix Design" worksheet
- Translate the Excel formulas and logic into well working Python functions
- Implement a step by step user input workflow that is similar to the Excel worksheet structure
- Automatically generate a labeled weight chart for one cubic yard of concrete
- Validate and test the model by replicating four realistic concrete mix design scenarios
- Provide the final code, an annotated code document, and other deliverables

Tasks

- Review the NDOT concrete Mix Design workbook to understand calculation flow, dependencies, and required inputs
- Identify all formulas and their parameters and provide an input-output function
- Translate the Excel function into a reusable Python function with clear instructions and names and a step-by-step user input workflow
- Verify by testing with various realistic concrete mix design scenarios
- Provide all deliverables to the client

Deliverables

- Python code containing the concrete mix design automation tool (.ipynb file)
- GitHub repository containing all source code, documentation, and a README file
- Scope of Work
- Gantt Chart illustrating the project timeline and task dependencies
- Annotated Code Document with explanations
- Four documented concrete mis design scenarios and results
- Written technical report including the Introduction, Methods, and Results