

Project Title: Water Table
Project Group: John Harrington, Andrew Nauss, Timothy Jordan, Danny Abdeen
Customers: Ed Hanzlik, John Wellin

1. Project Overview

The objective of the project is to engineer and develop a water table that will effectively demonstrate flow streamline behavior for laminar and turbulent flow regimes over different object geometries at different angles of attack. This project will be used as an educational tool to help students gain a better understanding of concepts in flow behaviors. Currently, students enrolled in fluids courses at Rochester Institute of Technology are expected to learn the concepts about streamlines, vortices, and flow separation mostly through in-class analytical examples and lectures. The water table would allow the opportunity for students to visualize flow, which would be extremely beneficial in increasing students' comprehension of topics associated with open fluid flow.

2. Customer Needs and Objectives

The customer for the water table is the RIT Mechanical Engineering Department. A budget of \$500 to \$1000 has been allocated for the project. The senior design team has worked with members of the RIT Mechanical Engineering faculty in addressing the needs and objectives for this project. Interviews were conducted to ensure the design will satisfy all customer needs. It is critical that the design must be portable, long lasting, and it must accurately visualize flow characteristics. Safety is also a major consideration.

3. Specifications

After determining customer needs and objectives, several specifications were defined for the system. The water table must be able to be transported easily and fit through a standard door. It must be reliable and stay clean with little degradation over time. The design must simulate horizontal fluid flow over a body and allow users to see inside over a free surface. Flow velocity must be able to be modified and measured. The equipment and water flow must both be safe for human interaction.

4. Justification

The water table would allow lecture time that is usually spent showing streamlines on a board or in the book to be augmented by the actual visualization of flow within the water table. Topics that could be taught include the basics of incompressible flow over a body using streamlines and flow separation.