Abstract

A good abstract is a concise summary of the entire project: introduction, problem statement, work accomplished, results, conclusions and recommendations. This requires efficiency of words and phrases. An abstract is written to stand alone, without jargon or reference to figures and tables in the report body. Note that an abstract emphasizes what was accomplished. The abstract should be about 200 words. The abstract should be on a separate page in the report. (See example below)

Key words

Provide a list of words or short phrases that are descriptive of your project — words that would enable a researcher to zero-in on your work in a database search. List these below the abstract. Future Senior Design Project students will locate your paper by searching on the key words. Include approximately 10 words. (See example below).

Sample Abstract and Keywords

ABSTRACT

Solo Cup Company manufactures a variety of thermoformed plastic cups and other food service goods. Solo Cup engineers design and maintain the tooling utilized in the thermoforming manufacturing lines. Thermoforming employs air pressure and vacuum tooling to supply suction to a plastic sheet, forcing it onto the walls of a female mold cavity in the shape of the final product. Solo Cup desires that the vacuum tooling employed within the thermoforming process be analyzed in terms of airflow efficiency, followed by measures to improve the efficiency. Analyzing and redesigning the tooling to improve vacuum airflow efficiency can lead to a reduced cycle time and thus an increased production rate. Solo Cup identified the mold cavity assembly as the area to be evaluated and improved. To arrive at a solution, the airflow through the original cavity was analyzed using fluid dynamics, and the resistance to airflow through the cavity was determined by use of a physical experiment that measured the flow rate through the cavity. Design modifications within the mold cavity were tested using Computational Fluid Dynamic (CFD) software, to yield visual representations of flow conditions. Significant changes have been incorporated into a prototype, which was manufactured by Solo Cup's machine shop. Testing of the prototype, in the physical

experiment, showed a 39% improvement at one-third the operating pressure and satisfies all the project goals, and is recommended for implementation.

KEYWORDS: thermoforming, airflow efficiency, mold cavity , computational fluid dynamics, CFD

Acknowledgements

Acknowledge the contributions of the Industry Partner, university staff, other students, faculty, and other persons who were of assistance. Be tactful in your descriptions of the contributions of those acknowledged.

Table of Contents

The table of contents should reflect the organization of the report. Sections and subsections in your report should be numbered and titled in such a way as to assist the reader in understanding the organization of the report. In MS Word, legal-formatted outline numbering works very well for a structured table of contents. The Table of Contents should follow the abstract and be on a separate page.

See the following example from Spring 2003 project for Solo Cup Company entitled: “Thermoforming Air Pressure/Vacuum Analysis.”

Note that the Table of Contents is structured to exactly follow the list of Team Objectives which will be shown later in this handbook. The Team Objectives should map out the “plan of attack” for solving the problem. The Team Objectives provide an excellent structure for the rest of the report and show the reader what to expect in the rest of the report.

This Solo Cup report is chosen as an excellent example. It was also awarded the Gold Award in the Lincoln Arc Foundation National Engineering Design Competition, and the Bernt O. Larson Award in the General Engineering Department for the outstanding Senior Design Project for the Year 2003.