

Senior Design Project Description

Company Name	Siemens	Date Submitted	7/7/17
Project Title	TBC Coating Standardization (SIEMENS_TB)	Planned Semester	Fall/Spring

Personnel

Typical teams will have 4-6 students, with engineering disciplines assigned based on the anticipated Scope of the Project. 250 hours are expected per person.

Complete the following table if this information is known, otherwise the Senior Design Committee will develop based on the project scope:

Discipline	Number	Discipline	Number
Mechanical	2	Electrical	
Computer		Systems	
Other ()			

Project Overview:

The Combustion COC has 2 similar Thermal Barrier Coating (TBC) machines used to apply a powdered material to the surface of combustion components. The coaters are presently yielding different results in terms of process inputs and outputs, which has made the forecasting of TBC powder consumption difficult. One of the coaters has been found to use significantly more powder to produce the same results as the other coater. To start, this project will concentrate on the standardization of the TBC coating machines in the Combustion COC of Siemens. The students will work with two Plasma Coating Machines to standardize the processes setup, and provide a more repeatable and uniform coating. The second phase of this project will be similar to a green belt project, where the students will engineer a solution to reduce the powder consumption while reducing coating time in the machine.

Initial Project Requirements:

The team will be required to identify all the variables of the coating process and set up standard work for each variable to ensure all operators are controlling the process inputs. The students will be working with the technical team to create tooling for the operators to use to accurately set up the machines. After standardization is achieved, the students will then run a DOE (or similar) to determine the optimal coating parameters to minimize the cost of coating the hardware.

Expected Deliverables/Results:

1. *The process will have a documented standardized setup procedure for the operators to*



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- follow.
2. The coaters will be utilizing similar amounts of powder to coat the hardware (+/-10% by weight)
 3. Complete a DOE to understand the effects that the process inputs have on the coating process.
 4. Optimize the coating process to achieve a 20% reduction in powder consumption while maintaining acceptable coating microstructure and thickness.(stretch goal)

Disposition of Deliverables at the End of the Project:

All standardized tooling will be developed to support the setup of the coating booths and process specifications written to guide the operators through a setup, will be proprietary to Siemens. Documentation and tooling will be used as a training aid for future operators/engineers. Any coating or robotic program parameters and settings specifically used to coat Siemens hardware will also be proprietary to Siemens.

List here any specific skills, requirements, knowledge needed or suggested (If none please state none):

1. Design (UG)
2. Manufacturing
3. Programming (robotic)
4. 6-Sigma (Black belt is mentoring the project)

Due to the complications of having multiple students in here with various development projects, background checks, and IPAs, I request that this project be limited to Giovanni Fiorillo and Kathryn Lawther. These students have been working as interns for Siemens Combustion, and have already been working on skills to be successful with this project.