

Senior Design Project Description for FALL 2016

Project Title: Paint Booth Spray Nozzle Optimization (NUC_NOZZLE)

Supporter: Nucor

Supporter Technical Representative: ASSIGNED

Faculty Mentor: _____ ASSIGNED TBD (check one)

Single Team Dual Team _____ (check one)

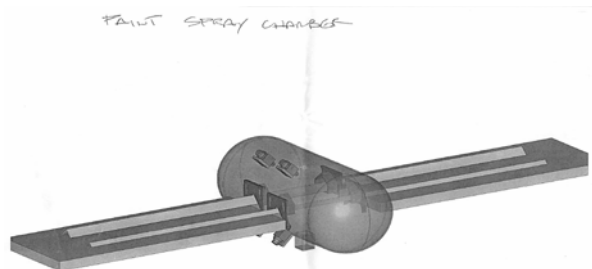
Personnel (EN/ET): _____ E, _____ Cp, _____ Cv, 5 M, _____ SE

(Complete if the number of students required is known)

Expected person-hours: (250 per student)

Description of Project:

Nucor uses a small (approximately equivalent to a 5 gallon bucket) spray booth to paint iron bars/plates as shown in the sketch below. The steel is continuously fed through the booth as the paint is sprayed. The spray is constant with no variations in paint flow as the iron feed speed changes. This project will both optimize the nozzle design and provide paint spray control for different iron speed rates. The project will quantify the characteristics of different nozzle designs.



Initial Project Requirements (e.g. weight, size, etc.):

The new nozzle design will be based on commercially available paint spray nozzles. The characteristics of each nozzle will be quantified. The optimum nozzle will be chosen based on most uniform coverage and least waste. A control system will be designed to optimize the nozzle performance at different iron feed speeds. The nozzle characterization will include a CFD analysis.

A test apparatus will be built and used to verify the design.

Expected Deliverables/Results:

A report is required to document the design, analysis and testing results. It will include the control system design

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

Knowledge of CFD is a plus