

UNC Charlotte – Lee College of Engineering Senior Design Program

Senior Design Project Description

Company Name	<i>Denso</i>	Date Submitted	<i>12/3/19</i>
Project Title	<i>Bearing Press Failure on DC Motor Assembly SJ66 (DENSO_SJ66)</i>	Planned Starting Semester	<i>Spring 2020</i>

Personnel

Typical teams will have 4-6 students, with engineering disciplines assigned based on the anticipated Scope of the Project.

Please provide your estimate of staffing in the below table. The Senior Design Committee will adjust as appropriate based on scope and discipline skills:

Discipline	Number	Discipline	Number
Mechanical	3	Electrical	1
Computer		Systems	1
Other ()			

Company and Project Overview:

DENSO, one of the world’s largest automotive parts suppliers. We manufacture DC electric motors for; Power windows, wiper motors, HVAC blowers, moon roof, sliding panel doors, Radiator cooling fan motors, Power steering assist, rear hatch motors and others.



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Products made in North America



This project will be done with the ASMO North America operation located in Statesville, NC. This facility is a large, high volume facility that supplies motor products to many well known OEM's such as Toyota, Honda, BMW, etc. Currently, 488 people are employed in this facility and several million motor assemblies are produced here each year.

Demanding performance requirements of today's car manufacturers make performance and quality paramount in this high volume, precision manufacturing environment.

This project will be focusing on the new HVAC Blower motor used in a high variety of cars/trucks produced in North America. From time to time, we encounter higher than normal vibration frequencies on the initial build. We would like to reduce the number of rejects for this type of reject. We will be investigating all component level variability and stack up tolerances in order to determine root cause of the elevated vibration frequency.

Project Requirements:

Design Problem: During the assembly process of our two bearings on the SJ66 Blower Motor are resulting in an operation noise that leads to rejected motor assemblies. This in-process rejects (IPRs) are a large portion of the scrap cost for this product.

Objectives: Analyze how the bearings assemble onto the shaft and how this may create the noise phenomenon. Thereby, by establishing the process design, the team would reduce the occurrence of the IPRs to our process. Need to identify a process design or component design change that would alleviate the phenomenon.

Expected Deliverables/Results:



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- Outline each manufacturing process
- Outline current process design and process tolerances in matrix form
- Design D.O.E with parts produced and process design with lowered standard variation of bearing noise and process tolerances with final assembly vibration data.
- Goal: eliminate bearing noise condition in the process design in the final motor vibration testing.
- We can help create a visual display with all process design conditions and component stack up with the activities throughout the project with corresponding data.

Disposition of Deliverables at the End of the Project:

Turn over to the supporter at the end of Expo

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

- Statistical Problem Solving methodology. Know how to set up Design of Experiments (D.O.E)
- Basic Understanding of Bearing Operation and DC Motor Operation.
- Basic Machining and Pressing Operations
- Good Data Collecting methodology.
 - Note: we will support and mentor in areas where team may require help.
- SEGR4141 – Engineering Experimental Design