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Team 521: Housing/Chassis Design for Engine Electrical Accessories

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Abstract

The abstract is a concise statement of the significant contents of your project. The abstract should be one paragraph of between 150 and 500 words. The abstract is not indents.

Keywords: list 3 to 5 keywords that describe your project.

Disclaimer

Your sponsor may require a disclaimer on the report. Especially if it is a government sponsored project or confidential project. If a disclaimer is not required delete this section.

Acknowledgement

These remarks thanks those that helped you complete your senior design project. Especially those who have sponsored the project, provided mentorship advice, and materials. 4

- Paragraph 1 thank sponsor!
- Paragraph 2 thank advisors.
- Paragraph 3 thank those that provided you materials and resources.
- Paragraph 4 thank anyone else who helped you.

Table of Contents

List of Tables

List of Figures

Notation

A17	Steering Column Angle
A27	Pan Angle
A40	Back Angle
A42	Hip Angle
AAA	American Automobile Association
AARP	American Association of Retired Persons
AHP	Accelerator Heel Point
ANOVA	Analysis of Variance
AOTA	American Occupational Therapy Association
ASA	American Society on Aging
BA	Back Angle
BOF	Ball of Foot
BOFRP	Ball of Foot Reference Point
CAD	Computer Aided Design
CDC	Centers for Disease Control and Prevention
CU-ICAR	Clemson University - International Center for Automotive Research
DDI	Driver Death per Involvement Ratio
DIT	Driver Involvement per Vehicle Mile Traveled

	Difference between the calculated and measured
Difference	BOFRP to H-point
DRR	Death Rate Ratio
DRS	Driving Rehabilitation Specialist
EMM	Estimated Marginal Means
FARS	Fatality Analysis Reporting System
FMVSS	Federal Motor Vehicle Safety Standard
GES	General Estimates System
GHS	Greenville Health System
H13	Steering Wheel Thigh Clearance
H17	Wheel Center to Heel Pont
H30	H-point to accelerator heel point
HPD	H-point Design Tool
HPM	H-point Machine
HPM-II	H-point Machine II
HT	H-point Travel
HX	H-point to Accelerator Heel Point
HZ	H-point to Accelerator Heel Point
IIHS	Insurance Institute for Highway Safety
L6	BFRP to Steering Wheel Center

Chapter One: EML 4551C

1.1 Project Scope

1.2 Customer Needs

1.3 Functional Decomposition

After studying the project scope and customer needs, the housing assembly was further decomposed into smaller, more precise functions and sub functions. Analyzing the system on a smaller scale and developing an understanding of what each function needs to accomplish; helps to visualize possible design solutions and to see how improvements can be made to the overall system.

The three main functions of the design that are crucial to its success are listed below:

- Support
- Protection
- Minimize Manufacturing

The sub functions will then be followed by the main functions. Each sub function represents an aspect of the main function that needs to be accomplished for the system to be successful. The support system for the housing is an important part of the design because of its integral role of turbine operation. In order to improve the support of the housing, the ignition system components need to be secure. If the position of the housing is altered, the components inside

could be damaged or misaligned. The housing needs to be durable and strong; in the event that debris hits the housing while the turbine is on and operating, it is important that the housing is durable enough to withstand the blow and continue functioning as intended. Because of all the moving parts of a turbine, the housing will experience vibration that could possibly damage the components inside. The housing needs to be stable and mounted well enough to reduce the effects of vibration. Protection is another important role of the housing assembly. The housing will experience random lighting strikes while the plane is in the air. There will be thermal challenges experience because of the mounting position of the housing being directly on the turbine. Extreme heat from the turbine and/or extreme cold from the environment around the turbine are all possible experiences. Again, the design needs to be durable in order to maintain protection of the components inside of the housing assembly. Lastly, manufacturing time needs to be minimized. To do that, the process of assembling the housing needs to be altered to make it easier to assemble. The disassembly process needs to be more efficient. It is important that each ignition component isn't damaged when trying to disassemble the housing for maintenance purposes. Also, the cost needs to be maintained at the current labor rate in order to prove that the job can be done without adding more work to the overall manufacturing process. The matrix that includes the main functions and sub functions is shown below.

Sub-Functions	MAIN Function		
	Support	Protection	Enhance Manufacturing
Secure main ignition system components	×		
Determine more efficient assembly method			×
Shield against lightning strikes		×	
Maintain stability	×		
Decrease weight			×
Handle large temperature ranges		×	
Allow for easy disassembly and maintenance			×
Provide durability	×	×	
Reduce cost			×

Table 1: Functional Decomposition Matrix

1.4 Target Summary

1.5 Concept Generation

Concept 1.

Concept 2.

Concept 3.

Concept 4.

Concept n+1.

1.6 Concept Selection

1.8 Spring Project Plan

Chapter Two: EML 4552C

2.1 Spring Plan

Project Plan.

Build Plan.

Appendices

Appendix B: Functional Decomposition

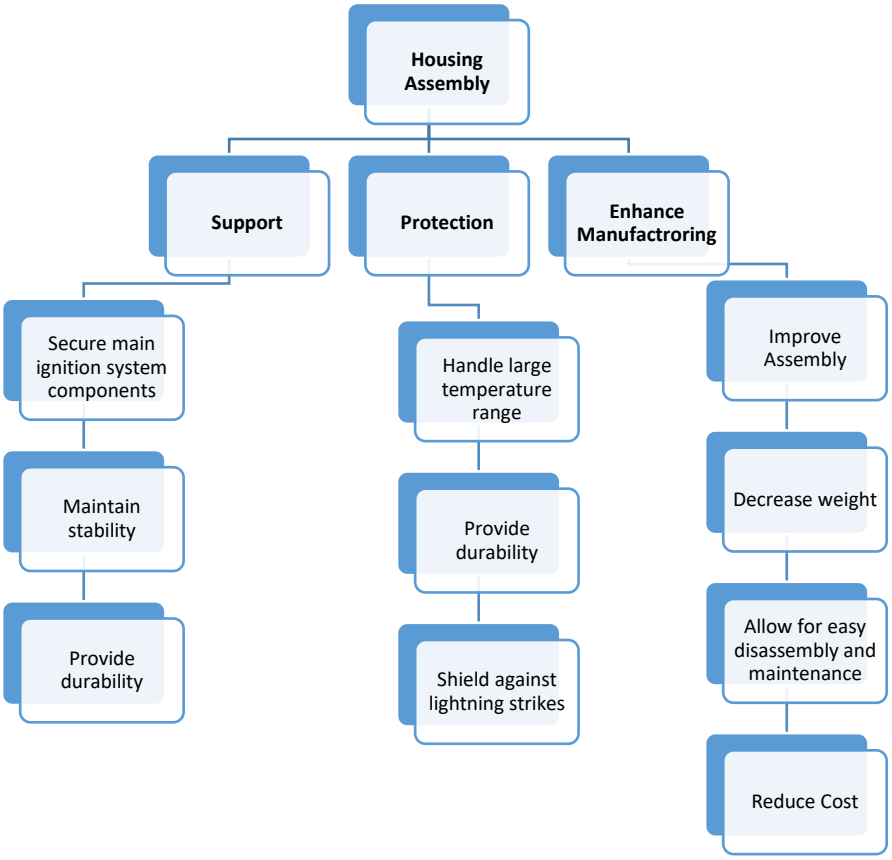

Figure 1: Functional Decomposition