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Spring 2020

Determination and Validation of Mechanical Properties of Materials and Substructures

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(Honors Project)

Determination and Validation of Mechanical Properties of Materials and Substructures



Author:

Karl Bates

Advisor:

Dr. Nicholas Garafolo

(For Public Release)

Honors Research Project Proposal

Please Print

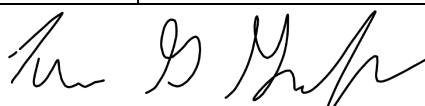



Name: Karl Bates	Student ID: 2924334
Email (@zips.uakron.edu):	kjb128@zips.uakron.edu
Title of Proposed Project:	Determination & Validation of Mechanical Properties of Materials and Substructures
Major: Mechanical Engineering	Graduation: Spring 2020

Please include a brief (maximum 200 words) abstract of your project

The nature of this project is confidential and cannot be disclosed in detail. Generally, this project involves the manufacturing of an original design, which is subjected to a variety of tests – including tensile, compressive, bending, fatigue, and environmental testing, as well as qualitative destructive tests – to determine the mechanical properties of the component. This testing data will be compared with values predicted using Finite-Element Analysis. The validation of predicted FEM values is crucial to the success of this component, as it is designed for life-critical applications. If test results indicate poor performance, considerable redesign will be necessary.

Please attach your written project proposal to this page

Approval:

Honors Course No.: 4600:497-001	No. of Project Credits: 4
Honors Project Sponsor	
Signature/Date	Dr. Garafolo  29 April 2020
Print name	Nicholas G. Garafolo Email: garafolo@uakron.edu
Reader	
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Signature/Date	Dr. Morscher  4/14/2020
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Honors Faculty Advisor	
Signature/Date	Dr. Garafolo  29 April 2020
Print name	Nicholas G. Garafolo Email: garafolo@uakron.edu
(for internal use only)	
Dean, Honors College	
Signature/Date	

Senior Design Project I

Student Name: Karl Bates

Student ID: 2924334

email: kjb128@zips.uakron.edu

Project Advisor/Sponsor Name: Dr. Nicholas Garafolo

Honors Project []

Project Title: Determination and Validation of Mechanical Properties of Materials and Substructures

Attach Project Proposal []

Confirm Registration in COD []

Design Criteria: Not applicable / not permissible to release

Attach Project Schedule [] (not permissible to release)

*** **This form is to be completed, approved and copies given to advisor and ME Office by week 4 of semester (10 pts)

Interim Report (Design Status) and all required parts ordered by week 14 of the semester (report 80 points; order confirmation 10 pts). Note: also update office copy.

Senior Design Project II

Confirm completion of COD []

Report update of Design Status by week 4 of semester (15 pts)

Final Technical Report and project due end of week 13 of semester (85 pts)

All interim (suggested bi-weekly) meetings to be scheduled with advisor.

Abstract (Public Release Version)

The nature of this project is confidential and cannot be disclosed in detail. This project involves the manufacture of an original design, which is subjected to a variety of tests (including tensile, compressive, bending, fatigue, and environmental, destructive) to determine the mechanical properties of the design. The procedure, results, and conclusions from these tests is the focus of this report.

Such test results are compared against predictions made using Finite-Element Analysis^d. The validation of predictive FEM values is crucial to the success of this design, as it is intended for life-critical applications. If test results indicate poor performance, considerable redesign may be necessary.