

Flagging Identity



How can CNC Machines be utilized to design digital and physical prototypes for the development of maritime products?

Suggested Equipment Skill Level

Beginning User

Equipment Skills

3D Design

Boatswain and Marine Machinist

Career & Skillset Connections

- Communication
- Problem Solving
- Technical Skills (CAD and CAM)

Project Guiding Themes

- Engineering design process
- Designing in 3D modeling software
- Designing a prototype that meets multiple constraints

Suggested Software & Materials

- 3D Modeling Software
TinkerCAD, OnShape, Autodesk Fusion 360, Autodesk Inventor, Solidworks
- Carbide Create Software
- Paint/Markers

Aligned VDOE CTE Course(s) and Competencies

Production Systems

36-Weeks

Communication Systems

36-Weeks

Manufacturing Systems

I
36-Weeks



Flagging Identity

CNC Beginning Skill Level

How can CNC Machines be utilized to design digital and physical prototypes for the development of maritime products?

Project Problem & Career Prompt

Imagine that you are a Boatswain of a ship, and your ship is caught in a sudden storm. The captain asks everyone on board to grab a nautical flag and hold it up to help signal for help. You look down at the flag in your hand, and it's a flag with the letter "N" on it. As you hold up the flag, you start to think about what it means to communicate using nautical flags. You realize that each flag has a different meaning and represents a letter of the alphabet, and that using them correctly is essential to ensure the safety and well-being of everyone on board. Your captain takes note of your interest in nautical flags and asks you to design a nameplate for the ship using them. He explains that the nameplate will be displayed on the bridge for all to see and will represent the ship's identity or mission. You will need to work with the marine machinist who will be creating the prototype of nameplate on the CNC machine at the shipyard.

Project Background & Resources

Nautical Flags

<https://www.discoverboating.com/resources/nautical-flag-meanings>

Investigative Questions

What is the purpose of nautical flags?

How do you effectively communicate between the a client and a designer?

Project Criteria

- Consider the space you have for the prototype on the CNC machine and what word, or phrase will represent the ship's identity or mission
- Physical prototype must correctly visually represent the nautical flags chosen for the nameplate
- Colors used on the flags must accurately represent the nautical flag(s)
- Final physical prototypes must be completed prior to project deadline

Project Constraints

- CNC Machine must be used for all parts of the prototype
- Nameplate must be designed by you (cannot use prefabricated models)
- Prototype size cannot exceed the 8" x 8" x 3" cutting area
- Prototype must be constructed from wood material

Suggested Pacing

1-2 Days of research and sketching ideas

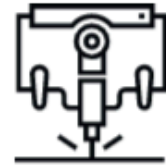
1-2 Days of design

2-3 Days of constructing prototypes

Flagging Identity

CNC Machine

Career & Skill Set Connections



Boatswain

The Boatswain is the chief of the deck crew and responsible for a ship's interior and exterior

Marine Machinist

A marine machinist is a skilled tradesperson who works with a variety of tools and machines and can read blueprints or technical diagrams.

Essential Skills

- *Technical and Creative
- *IT Skills (CAD)
- *Mechanical
- *Problem Solving
- *Oral and Written Communication Skills

Academic Pathway

High School Diploma
and
Community College/Certification
or
Bachelor's degree



Aligned VDOE CTE Course(s) and Competencies

Workplace Readiness Skills & Work-Based Learning Opportunities & Examine All Aspects of an Industry

Production Systems

Analyzing Design

Communicate ideas through sketching, technical drawing, computer-aided design and drafting, or storyboarding

Developing Abilities for a Technological World

Construct models and/or prototypes

Perform secondary processing operations on stock to produce products

Manufacturing Systems I

Explore Materials and Processes

Describe subtractive processes

Distinguish among materials used in the manufacturing process

Use materials to make a product

Understanding Production Processes

Explain the product-development process

Describe the engineering design process

Apply technology to produce a prototype

Use the engineering design process to plan production

Describe production planning in manufacturing

Evaluate the process and the prototype

Communication Systems

Introducing Communication Systems

Identify purposes for communication

Exploring Digital Visualization

Explain digital visualization

Generate a simple, digital, three-dimensional model

Modify a simple, digital, three-dimensional model



Project Management Plan

**Team
Member
Roles**

**Team
Goals
&
Timelines**

**Team
Member
Tasking**

Sketches & Design Planning

